

1-, 2-, and 4-Port Industrial Ethernet Serial Servers

Connect RS-232, RS-422, or RS-485 devices to an Ethernet network.

Access the serial ports over a LAN/WAN using Direct IP Mode, Virtual COM Port, or Paired Mode connections.



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14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
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 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

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Quick Start Guide

For descriptive purposes, this Quick Start Guide considers a typical configuration consisting of a PC connected via an Ethernet LAN to a 2-Port Industrial Serial Server connected to the RS-232 port of a serial device.

Hardware Setup

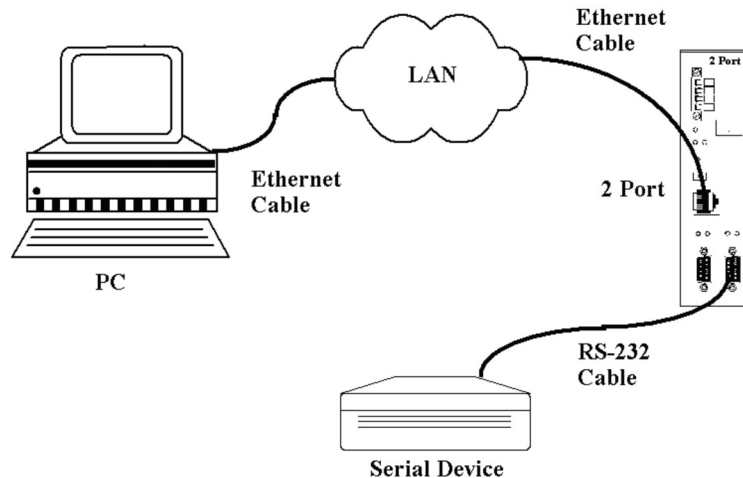


Figure QS-1. Typical hardware setup.

Step 1: Connect the Serial Server to the network using a standard network cable.

Step 2: Connect the Serial Server to the RS-232 port on the serial device.

NOTE: If the serial device is configured as a DCE, use a straight-through serial cable. If the serial device is configured as a DTE, use a crossover (null-modem) cable.

Step 3: Set the Run/Console DIP switch to the Run position.

Step 4: Apply power to the Serial Server.

Software Installation

Using the CD included with the serial server, install the Serial Server Manager software on the configuring computer.

Serial Server Configuration

Step 1: Open the Serial Server Manager software. It will automatically search for any reachable Serial Servers. A list of all Serial Servers connected to the LAN will appear in the Serial Server List window.

Step 2: Double-click the desired Serial Server port on the list to bring up the Server Properties configuration screen.

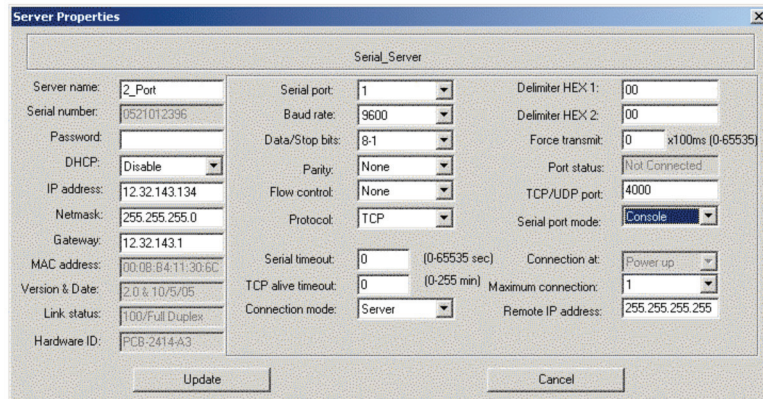


Figure QS-2. The Server Properties window.

Step 3: Change the Server Properties as required.

- Enable DHCP to allow the Serial Server to generate its own IP address

OR

- Obtain appropriate static IP, netmask, and gateway addresses from your Network Administrator (recommended).
- Set the Serial Port Mode property to RS-232 to match the serial device connected to the Serial Server.
- Set Baud Rate, Data/Parity/Stop, and Flow Control to match the configuration of the serial device connected to the Serial Server port.

Step 4: When the parameters have been set, click "Update." Following the prompts in the dialog boxes, Restart the Serial Server and Search all reachable servers again.

Step 5: Re-enter Server Properties to verify the changes have taken effect, or to view/change the configuration of other ports. Each port must be configured separately.

Install Virtual COM Ports on PC

Step 1: From the Windows Start menu, run the Install Virtual COM Ports utility included with the Serial Server Manager software,

Step 2: Search for all servers on the network

Step 3: Select a port and map it to an unused COM port (for example, Port 15). Configure it for TCP protocol and the appropriate IP address (determined in the last section).

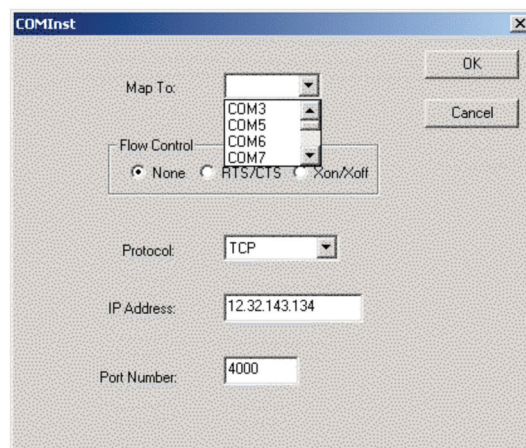


Figure QS-3. Configuring the Virtual COM Port.

Check Communications

Step 1: From the Windows Start menu, run HyperTerminal.

Step 2: Configure HyperTerminal to connect using the COM port configured in the last section (for example, Port 15).

Step 3: Set Baud Rate, Data/Parity/Stop, and Flow Control to match the configuration of the serial device connected to the Serial Server serial port.

Step 4: Communications with the serial device should now be operational.

Chapter 1: Specifications

1. Specifications

1.1 General

Approvals — FCC, IP30 case

Configuration Options — Console mode: Using RS-232 with VT100™ emulation;
Telnet mode: Using HyperTerminal with VT100 emulation;
Serial Server Manager: Windows® 98/ME/2000/2003 Server/XP, Windows NT, Windows Vista®;
Web server: Using Internet Explorer® Web browser

Data Rate — 110 bps to 230.4 kbps

I/P Port Addresses — 5300: Heartbeat and Configuration setting in TCP mode (that is, Pair mode);
8888: Serial server update;
8890: Serial server monitor;
8889: Set configuration in UDP mode

Management — Manager, Web Server, Serial Console, Telnet

Memory — Serial: 8 KB per port;
Network: 48 KB

Network Communications — LAN: 10-/100-Mbps Autodetecting 10BASE-T, 100BASE-TX;
RS-232: TX, RX, RTS, CTS, DTR, DSR, DCD, GND;
RS-422: TX+, TX-, RX+, RX-, RTS+, RTS-, CTS+, CTS-, GND;
RS-485H: Data+, Data-, GND;
RS-485F: TX+, TX-, RX+, RX-, GND

Operating System — Windows 2000, 2003 Server/XP, 2008, Windows Vista, Windows 7

Optional Accessories — (1) null-modem crossover cable for DTE-to-DTE connection;
(1) 3.2-ft. [1-m] 35-mm steel DIN rail

Protocols — TCP, IP, ARP, DHCP, Telnet, HTTP, UDP, ICMP

Serial Interfaces — RS-232 (DTE): TXD, RXD, RTS, CTS, DTR, DSR, DCD, GND;
Terminal block (LES401A only): TXD, RXD, RTS, CTS, GND;
RS-422: TXDB(+), TXDA(-), RXDB(+), RXDA(-), RTS(+), RTS(-), CTS(+), CTS(-), GND;
RS-485H: Data B(+), Data A(-) and GND;
RS-485F: TXDB(+), TXDA(-), RXDB(+), RXDA(-), GD;
Baud Rate: 110 bps to 230.4 bps
Parity: None, Even, Odd, Mark, Space
Data Bits: 5, 6, 7, or 8
Stop Bits: 1, 1.5, or 2

User Controls — LES401A: (1) DB9/terminal block switch

Connectors — LES401A: (1) 4-pin terminal block (removable) for DC power, (1) DB9 male, (1) RJ-45 for Ethernet;
LES402A: (2) DB9 male, (1) RJ-45 for Ethernet;
LES404A: (4) DB9 male, (1) RJ-45 for Ethernet

Indicators — Power: Red LED, Link: Yellow or green LED (10BASE-T or 100BASE-TX),
Ready: Flashing green LED

Temperature Tolerance — Operating: +14 to +176° F (-10 to +80° C);
Storage: -4 to +185° F (-20 to +85° C)

Relative Humidity — 5 to 98%

Power Requirements — 8 VAC to 24 VAC or 9 VDC to 48 VDC

Power consumption: LES401A: 320 mA @ 12 VDC,

LES402A: 340 mA @ 12VDC,

LES404A: 360 mA @ 12 VDC;

Power supply start-up time: ≤24 ms

Power connector: Terminal block

Size — 1.75"H x 6.1"W x 4.1"D (4.46 x 15.52 x 10.46 cm)

1.2 Default Settings

Baud Rate — 9600

Data/Stop — 8–1

Delimiter HEX 1 — 00

Delimiter HEX 2 — 00

DHCP — Disable

DIP Switch Settings — 1-Port Serial Server: 1=Run, 2=DB9;

2- or 4-Port Serial Server: Run

Flow Control — None

Force Transmit — 0 ms

Gateway — 192.168.0.254

IP Address — 192.168.0.1

MAC Address — Fixed (see bottom label on unit)

Maximum Connection — 1

Net Mask — 255.255.255.0

Password — Blank

Parity — None

Server Name — 1_Port, 2_Port, or 4_Port

Serial Number — xxxxxxxxx (printed on bottom of unit)

Serial Port Mode — RS-232

Serial Server Port — 1

Serial Timeout — 0 seconds

TCP alive timeout — 0 minutes

TCP/UDP Port — Port 1: 4000;

Port 2: 4001;

Port 3: 4002;

Port 4: 4003

Remote IP Address — 255.255.255.255

RS-232 Connection Mode — Server

TCP/UDP Protocol — 1-Port Serial Server Port 1: TCP;

2-Port Serial Server Ports 1 and 2: TCP;

4-Port Serial Server Ports 1–4: TCP

Version and Date — Current firmware version number and date

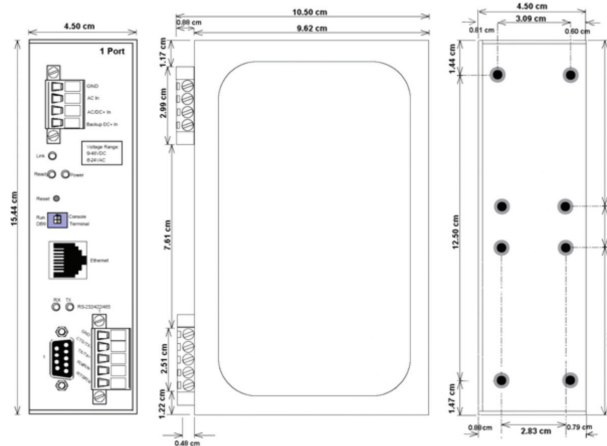


Figure 1-1. 1-Port Serial Server dimensions.

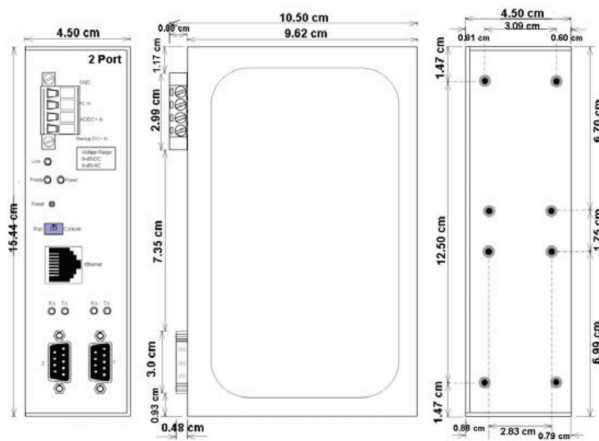


Figure 1-2. 2-Port Serial Server dimensions.

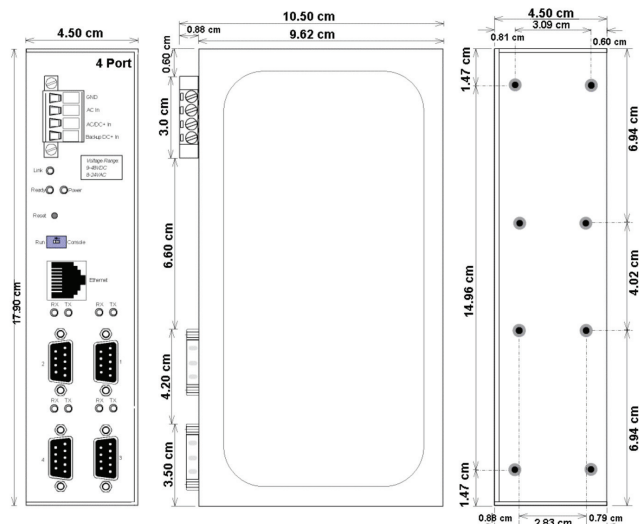


Figure 1-3. 4-Port Serial Server dimensions.

2. Overview

2.1 Introduction

1-, 2-, and 4-Port Port Industrial Ethernet Serial Servers enable connection of RS-232, RS-422, or RS-485 devices to an Ethernet network. You can access the serial ports over a LAN/WAN using Direct IP Mode, Virtual COM Port, or Paired Mode connections. The 10-/100-Mbps Ethernet connection auto-selects 10BASE-T or 100BASE-TX and indicates the type of connection with a bi-color link light. These serial servers are built for use in industrial environments, featuring an IP30-approved, slim-line, DIN-rail-mountable case. They operate from a range of AC or DC power supply voltages, support redundant DC power, and feature terminal block power connectors.

Industrial and commercial measurement and control systems often have standalone devices with unused serial ports. Black Box® Serial Servers allow you to connect those ports into your existing LAN or WAN, giving you access to more information and the ability to configure, manage, and troubleshoot those devices from a control room, office, or even a distant location via a WAN. Save the cost, time and trouble of carrying a laptop out to devices located in distant, cold, dirty, or uncomfortable environments.

Connect your serial device to the serial port and connect the server to your LAN. Your networked computer “sees” the device over the network as a virtual serial connection. Black Box serial servers support TCP or UDP protocols and allow transmitting to and receiving from multiple IP addresses. There are four methods of configuring serial servers: via Management Software, Web Server, Telnet, or via a direct RS-232 console connection using a terminal program.

2.1.1 Applications

- Access remote devices with serial ports via your network.
- Manage, configure, and program devices remotely via a Web server.
- Use for industrial devices such as PLCs, drives, motor controls, process analyzers.
- Building/commercial/security—parking control, security, cameras.
- Traffic management—lights, systems, cameras.
- Retail/point of sale—cash registers, scanners, scales.

2.1.2 Manager Software

The Manager software allows easy access to the serial server to configure the server and its ports, upgrade server firmware, and monitor port status and activity. When the Manager opens, it will search for and display all serial servers on the network.

2.1.3 Monitor Port

The Monitor Port feature allows you to use any PC on the LAN/WAN to actively view and troubleshoot the communications status. It shows when there is a client connection to the server and the client IP address. It displays the number of bytes transmitted and received as well as the status of the hardware handshaking lines.

2.1.4 Web Server

Black Box serial servers can be accessed and configured from any Web browser (such as Internet Explorer) on the LAN/WAN. This allows you to remotely manage the software and your serial device. It also allows off-site troubleshooting.

2.1.5 Heartbeat Connection Protection

LES400A series Serial Servers provide automatic resumption of the TCP data connection in case of a power failure or loss of an Ethernet connection on either the client or server. Once the Heartbeat connection is established, the server sends a signal to the client every five seconds until communication is re-established. Without this feature, a device that loses a connection and stops communicating would not be able to reconnect without a person attending to the problem. The Heartbeat feature works with virtual COM and TCP direct IP connections.

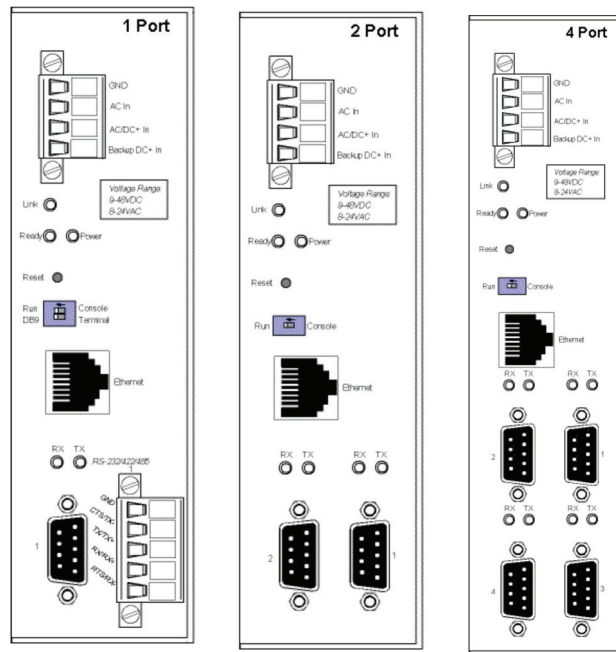


Figure 2-1. 1-, 2-, and 4-Port Industrial Serial Servers.

2.2 Features

- Multi-interface serial ports: The 1-Port Industrial Serial Server features one multi-interface serial port and the choice of standard DB9 M or removable terminal block connections (switch selectable).

The 2-Port Industrial Serial Server features two multi-interface serial ports.

The 4-Port Industrial Serial Server features four multi-interface serial ports.

All ports are software selectable as RS-232, RS-422, RS-485 half-duplex, or RS-485 full-duplex interfaces.

For all models Port 1 is software, or DIP switch selectable for Console Mode operation (configuration via direct serial connection).

- Slim-line, DIN-rail-mountable case.
- Accepts AC or DC power over a wide voltage range.
- Redundant DC power supply input.
- 10-/100-Mbps Ethernet with Auto Selection.
- LAN and WAN communications.
- TCP or UDP client or server operation—configurable.
- Software support—2000/2003 Server/XP/Vista/2008/Windows 7.
- Firmware upload for future revisions/upgrades.
- Can be accessed and configured via a Web browser using Web Server.
- Supports RS-232, RS-422, and RS-485 half- and full-duplex serial interfaces.
- Terminal block power connectors for industrial installations.
- LES401A has a terminal block and a DB9 serial connector.
- In Server mode, supports eight individual client sessions.

- UDP mode allows broadcast to and from multiple IP addresses.
- Management access password protected.
- Configure the Ethernet and serial port settings using any of four methods:
 1. Serial Server Manager Software for Windows enables configuration via a network connection or directly from the Ethernet port of a computer (using an Ethernet crossover cable).
 2. Web Server enables configuration via the network using a Web browser.
 3. Telnet enables configuration via the network by accessing the setup configuration menu.
 4. Console Mode enables configuration through an RS-232 serial port in using a VT100 Terminal Emulation program and an RS-232 crossover cable.
- Virtual COM Driver Software for Windows for 2000/2003 Server/XP/Windows Vista/2008/Windows 7—installs virtual COM ports, viewable in the Windows Device Manager under Ports (COM & LPT). A Virtual COM port provides access to any of the ports on the Serial Server, like any other serial port (legacy, PCI, USB or PCMCIA) on the computer. Any program running on the computer and using Windows based COM ports can access the serial devices attached to the serial server. The LAN becomes transparent to the serial device and the software running on the PC.
- Heartbeat Connection—selectable protocol ensures reliable communications in Virtual COM Port or Paired Connection modes. This feature restores the connections if communications are temporarily lost at either end because of loss of power or loss of the Ethernet connection.

2.3 Communication Modes

The Serial Servers enable communication with serial devices over a LAN or WAN. Serial devices no longer are limited to a physical connection to the PC COM port. They can be installed anywhere on the LAN using TCP/IP or UDP/IP communications. This enables traditional Windows PC software access to serial devices anywhere on the LAN/WAN network.

2.3.1 Direct IP Mode

Direct IP connections allow applications using TCP/IP or UDP/IP socket programs to communicate with the asynchronous serial ports on the serial server. In this type of application, the serial server is configured as a TCP or UDP server. The socket program running on the PC establishes a communication connection with the Serial Server. The data is sent directly to and from the serial port on the server. When using UDP protocol, the server can be configured to broadcast data to and receive data from multiple IP addresses.

2.3.2 Virtual COM Mode

Install Virtual COM Mode enables the user to add a driver to provide a virtual COM port on the computer. The new COM port shows up in the Device Manager. Windows programs using standard Windows API calls are able to interface to virtual COM ports. When a program on the PC opens the new COM port, it communicates with the remote serial device connected to one of the ports on the Serial Server.

After connection, the LAN is transparent to the program and serial device. Applications are able to work just as if the serial device is connected directly to a physical COM port on the computer. The virtual COM port software converts the application's data into IP packets, sends it across the network to the Serial Server, which converts the IP packet back to serial data and sends the data out a serial port located on the Serial Server.

To use this mode, the Serial Server must be set to either TCP/server or UDP/server with a designated communication port number. The virtual COM driver is the TCP or UDP client.

Chapter 2: Overview

2.3.3 Paired Mode

Paired Mode is also called serial tunneling. In this mode, any two serial devices that can communicate with a serial link will be able to communicate using two Serial Servers and the LAN.

Two Serial Servers are connected to a network, one configured as a TCP or UDP client and the other as a TCP/UDP server. When setting up the server the remote IP address section must contain the address of the client. This will allow the client's IP address to pass the IP address-filtering feature of the server. Conversely, the Remote IP address of the client must contain the server's IP address. Both communication port numbers must be the same.

2.3.4 Heartbeat

The Heartbeat protocol connection provides a reliable communications connection in Virtual COM Port Mode or with Paired Connection Mode. This feature restores the connection if communications are temporarily lost at either end because of loss of power or Ethernet connection.

Without this feature, a device that loses a connection and stops communicating would not be able to reconnect without human intervention. A TCP data connection can be lost when there is a power failure or temporary loss of an Ethernet connection on either the client or server. If a loss occurs, the Heartbeat feature will try to reconnect the TCP data connection every five seconds until communications are established again. The Heartbeat feature is available for use in Virtual COM Port Mode and Paired Connection Mode. This is not available when using a UDP application.

2.4 What's Included

Your package should contain the following items. If anything is missing or damaged, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

- 1-, 2-, or 4-Port Industrial Serial Server module.
- (1) CD-ROM containing Serial Server Manager and Virtual COM Driver software for Windows 2000/2003 Server/XP/Vista/2008/Win 7 and this user manual in PDF format.

2.5 Hardware Description

Figure 2-2 shows the 1-Port Serial Server. Table 2-1 describes its components.

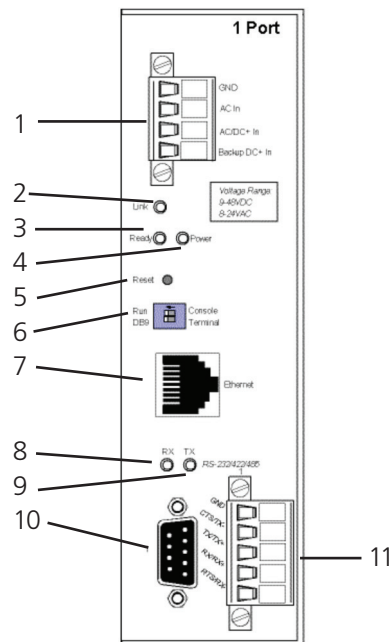


Figure 2-2. 1-Port Serial Server.

Table 2-1. 1-Port Serial Server components.

Number	Component	Description
1	(1) terminal block connector	Used for DC power.
2	(1) Link LED	Lights yellow for 10BASE-T or green for 100BASE-TX.
3	(1) Ready LED	Flashes green when the unit is ready to transmit/receive data.
4	(1) Power LED	Lights when power to the unit is on.
5	(1) Reset button	Press to reset the unit.
6	(1) 2-position DIP switch	Selects run or console mode.
7	(1) RJ-45 Ethernet connector	Connects to Ethernet.
8	(1) RX LED	Lights when data is being received.
9	(1) TX LED	Lights when data is being transmitted.
10	(1) DB9 connector	Connects to serial device.
11	(1) terminal block connector	Links to serial device.

Figure 2-3 shows the 2-Port Serial Server. Table 2-2 describes its components.

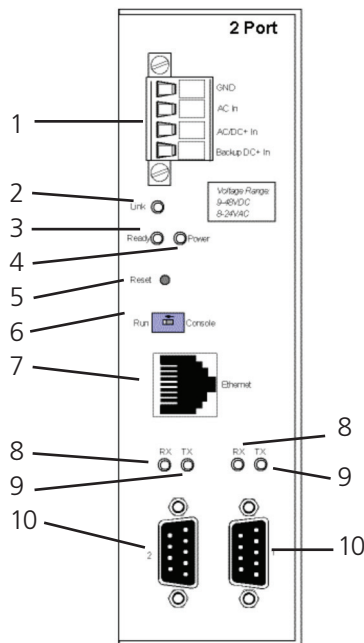


Figure 2-3. 2-Port Serial Server.

Table 2-2. 2-Port Serial Server components.

Number	Component	Description
1	(1) terminal block connector	Used for DC power.
2	(1) Link LED	Lights yellow for 10BASE-T or green for 100BASE-TX.
3	(1) Ready LED	Flashes green when the unit is ready to transmit/receive data.
4	(1) Power LED	Lights when power to the unit is on.
5	(1) Reset button	Press to reset the unit.

Table 2-2 (Continued). 2-Port Serial Server components.

Number	Component	Description
6	(1) 2-position DIP switch	Selects run or console mode.
7	(1) RJ-45 Ethernet connector	Connects to Ethernet.
8	(2) RX LEDs	Light when data is being received at the serial ports.
9	(2) TX LEDs	Light when data is being transmitted from the serial ports.
10	(2) DB9 connectors	Connect to serial devices.

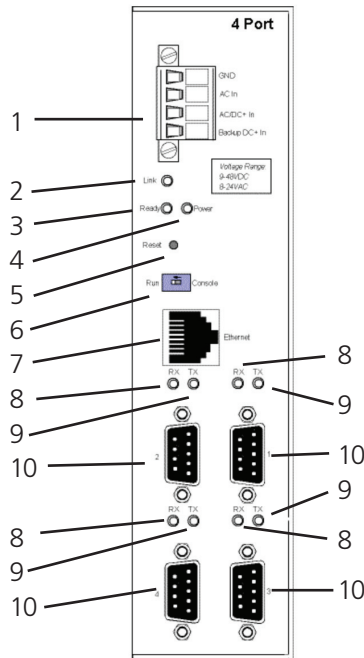


Figure 2-4. 4-Port Serial Server.

Table 2-3. 4-Port Serial Server components.

Number	Component	Description
1	(1) terminal block connector	Used for DC power.
2	(1) Link LED	Lights yellow for 10BASE-T or green for 100BASE-TX.
3	(1) Ready LED	Flashes green when the unit is ready to transmit/receive data.
4	(1) Power LED	Lights when power to the unit is on.
5	(1) Reset button	Press to reset the unit.
6	(1) 2-position DIP switch	Selects run or console mode.
7	(1) RJ-45 Ethernet connector	Connects to Ethernet.
8	(4) RX LEDs	Light when data is being received at the serial ports.
9	(4) TX LEDs	Light when data is being transmitted from the serial ports.
10	(4) DB9 connectors	Connect to serial devices.

3. Hardware Configuration

3.1 Serial Server Indicators, Switches, and Connectors

3.1.1 Indicators

- One bi-color Link LED (Yellow = 10BASE-T, Green = 100BASE-T)
- One green Ready LED (flashing = system ready)
- One red Power LED
- One red RX LED and one green TX LED for each serial port

3.1.2 Switches

Reset

A recessed reset switch that enables the unit to be reset. Insert a small plastic tool, press lightly and hold for three seconds. The Link and Ready lights will go out and then come back on.

Run/Console Switch

A recessed single DIP (dual inline package) switch that allows the Serial Server to be switched between Run Mode and Console Mode. When switched to the Console position, the Serial Server enters Console Mode. This allows you to configure the Serial Server from a PC running a terminal program, such as HyperTerminal®, without connecting the server to the network. To communicate with the connected serial device, the switch must be returned to the “Run” position.

DB9/Terminal Switch (1-Port Industrial Serial Server only)

Allows connection to the serial port (RS-232, 422 or 485) via the DB9 M connector or the five-terminal removable terminal block.

3.1.3 Connectors

Ethernet Connector

One standard RJ-45 receptacle that allows the Serial Server to be connected to an Ethernet hub, switch, or wallplate using a standard straight-through RJ-45 (male) Ethernet cable. To connect directly to an RJ-45 Ethernet port on a PC or laptop, a crossover Ethernet cable must be used.

Serial Port(s)

- 1-Port Industrial Serial Server: (1) serial port with (2) connector options: (1) (DB9 M) or (1) five-terminal removable terminal block (DIP switch selectable)
- 2-Port Industrial Serial Server: (2) serial port connectors (DB9 M)
- 4-Port Industrial Serial Server: (4) serial port connector (DB9 M)

NOTE: Refer to Appendixes A, B, and C for connection pinouts.

Chapter 3: Hardware Configuration

Power Connector

The power connector is a removable terminal block with four terminals. From top to bottom the terminals are:

Table 3-1. Power connector.

Terminal	Connect to	Description
GND	Negative side of DC power supply (if DC power used). Also connect negative side of backup DC power supply (if used).	Internally, the chassis ground of the serial server is connected to this terminal.
AC in	One side of AC power supply (if AC power used)	Either AC or DC power can be used to power serial servers. The power supply voltages can range from 9 VDC to 48 VDC or 8 VAC to 24 VAC.
AC/DC+ in	The other side of AC power supply (if AC power used) OR Positive side of DC power supply (if DC power used)	
Backup DC+ in	Positive side of backup DC power supply	Backup power must be DC voltage and can be any voltage between 9 VDC and 48 VDC.

3.2 Serial Server/Port Operational Modes

Using the Serial Server Manager, Web Server, or Telnet, the Serial Server can be put into Console Mode, Default Mode, or Upgrade Mode. The serial ports can be configured for RS-232, RS-422, RS-485H (half-duplex), or RS-485F (full-duplex) operation. The server also can be put into Console Mode by placing the Run/Console switch in the Console position.

3.2.1 Default Mode

When Default Mode is selected and the server properties are Updated (Saved), all the configuration settings return to their default values.

NOTE: Refer to Chapter 6 for details on Serial Server Configuration settings. See Chapter 1 for Serial Server default parameters.

3.2.2 Console Mode

In Console Mode, the Configuration Menu can be accessed from a PC by connecting its RS-232 serial port to the 1-Port Industrial Serial Server serial port or 2- or 4-Port Industrial Serial Server Serial Port 1. Since the computer is a DTE device and the serial ports are configured as DTEs (with DB9 M connectors), a null-modem crossover cable must be used.

In Console Mode, the default serial port settings are: 9600 baud, 8 data bits, no parity, and 1 stop bit. From Windows, HyperTerminal with VT100 terminal emulation can be used for Console Mode configuration.

NOTE: Refer to Chapter 10 for details on Console Mode.

3.2.3 Upgrade Mode

In Upgrade Mode, firmware can be uploaded from a PC via its serial port to the 1-Port Industrial Serial Server serial port or the 2-port or 4-Port Industrial Serial Server Serial Port 1. Upgrading also can be done via the network connection, using the Serial Server Manager software and a virtual COM port.

NOTE: Refer to Chapter 9 for details on Upgrade Mode.

3.2.4 RS-232 Mode

In RS-232 Mode, the currently selected serial port is configured as an RS-232 interface supporting eight RS-232 signal lines plus Signal Ground and is configured as a DTE, like a computer. Signals are single-ended and referenced to Ground. To use handshaking, Flow Control must be set to RTS/CTS during configuration.

3.2.5 RS-422 Mode

In RS-422 Mode, the currently selected serial port is configured as an RS-422 interface supporting four RS-422 signal channels with full-duplex operation for Receive, Transmit, RTS (Request To Send), and CTS (Clear To Send). The data lines are differential pairs (A and B) in which the B line is positive relative to the A line in the idle (mark) state. Ground provides a common mode reference. To use handshaking, Flow Control must be set to RTS/CTS during configuration.

3.2.6 RS-485H Mode

In RS-485H Mode, the currently selected port is configured as a two-wire RS-485 interface supporting DataB(+) and DataA(-) signal channels using half-duplex operation. The data lines are differential with the Data B line positive relative to Data A in the idle (mark) state. Ground provides a common mode reference.

3.2.7 RS-485F Mode

In RS-485F Mode, the currently selected port is configured as a four-wire RS-485 interface supporting transmit lines TXDB(+) and TXDA(-) and receive lines RXDB(+) and RXDA(-) for full-duplex operation. The lines are differential with the B line positive relative to A in the idle (mark) state. Ground provides a common mode reference.

3.2.8 RS-485 Receiver Biasing

RS-485 Receiver Biasing can be implemented from the Serial Server if the network does not supply it. Remove the four screws from the cover of the Serial Server, slide the cover off, and re-position the bias jumpers as indicated in the following diagrams and tables.

NOTE: The Serial Servers provide separate jumpers for RS-485 half-duplex and RS-422/485 full-duplex operation. Also, the 1-Port Industrial Serial Server provides separate jumpers for the terminal block and DB9 connectors. Biasing jumpers are also provided for CTS inputs.

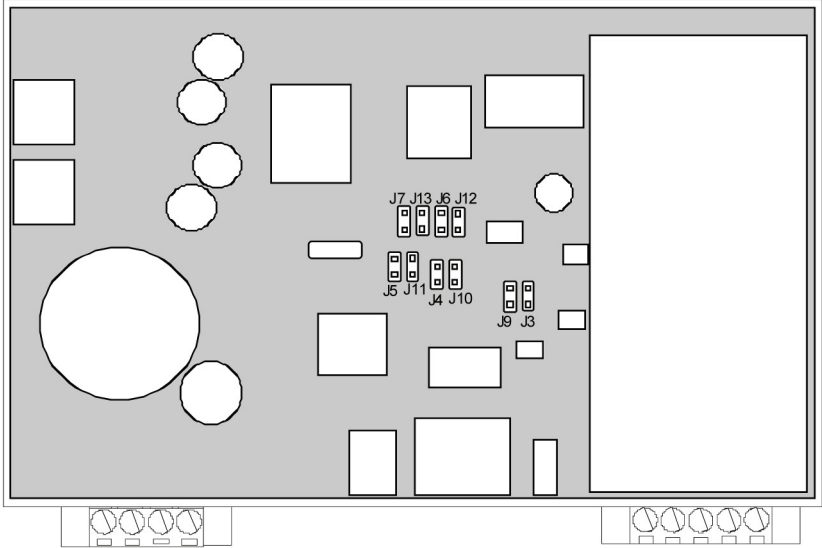


Figure 3-1. 1-Port Industrial Serial Server bias jumper locations.

Table 3-2. 1-Port Industrial Serial Server bias jumpers.

Connector	Interface Type	Jumper Number	Pull Up/Pull Down
Terminal block	485 half-duplex	J12	Pull up
		J6	Pull down
	422/485 full-duplex	J7	Pull up
		J13	Pull down
DB9	485 half-duplex	J3	Pull up
		J9	Pull down
	422/485 full-duplex	J5	Pull up
		J11	Pull down
	CTS	J4	Pull up
		J10	Pull down

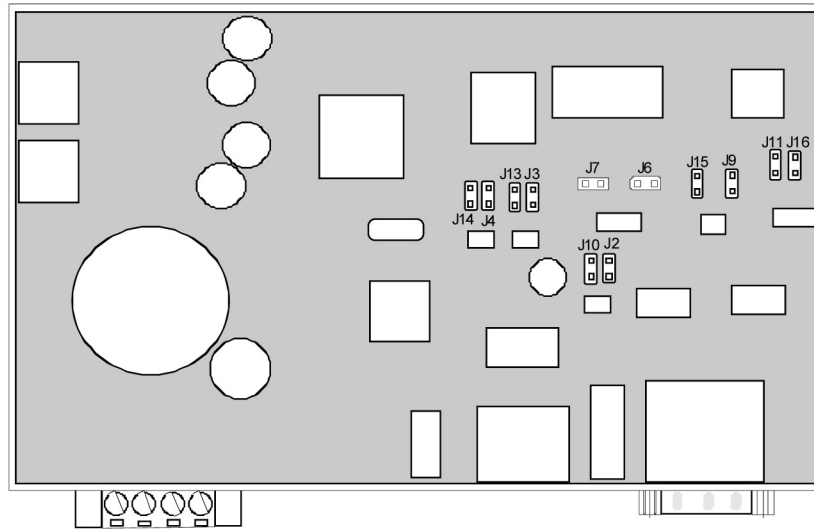


Figure 3-2. 2-Port Industrial Serial Server bias jumper locations.

Table 3-3. 2-Port Industrial Serial Server bias jumpers.

Port	Interface Type	Jumper Number	Pull Up/Pull Down
1	485 half-duplex	J2	Pull up
		J10	Pull down
	422/485 full-duplex	J4	Pull up
		J14	Pull down
	CTS	J7	Pull up
		J6	Pull down
2	485 half-duplex	J9	Pull up
		J15	Pull down
	422/485 full-duplex	J3	Pull up
		J13	Pull down
	CTS	J11	Pull up
		J16	Pull down

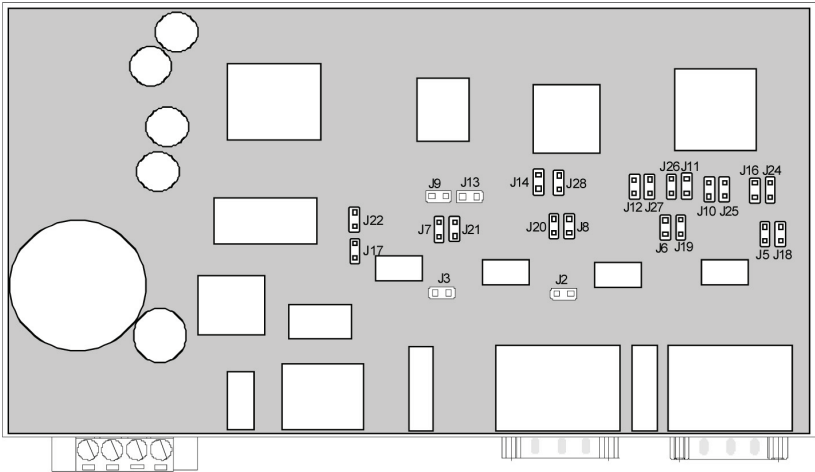


Figure 3-3. 4-Port Industrial Serial Server.

Table 3-4. 4-Port Industrial Serial Server bias jumpers.

Port	Interface Type	Jumper Number	Pull Up/Pull Down
1	485 half-duplex	J22	Pull up
		J17	Pull down
	422/485 full-duplex	J7	Pull up
		J21	Pull down
	CTS	J13	Pull up
2	485 half-duplex	J3	Pull up
		J2	Pull down
	422/485 full-duplex	J8	Pull up
		J20	Pull down
	CTS	J14	Pull up
3	485 half-duplex	J12	Pull up
		J27	Pull down
	422/485 full-duplex	J6	Pull up
		J19	Pull down
	CTS	J11	Pull up
4	485 half-duplex	J16	Pull up
		J24	Pull down
	422/485 full-duplex	J5	Pull up
		J18	Pull down
	CTS	J10	Pull up
		J25	Pull down

Chapter 4: Installing the Software

4. Installing the Software

The Windows based Serial Server Manager and Virtual COM Port software makes configuration fast and easy. If using Windows, we recommend installing the Serial Server Manager software and setting up virtual COM ports to configure the Serial Server.

The Serial Server software includes:

- Serial Server Manager software
- Install Virtual COM Ports
- Uninstall Virtual COM Ports

4.1 Automatic Installation

Step 1a: Insert the Serial Server CD in the CD-ROM drive to automatically launch the Install Shield Wizard.

4.2 Manual Installation

Step 1b: To manually start the software installation, from the Windows Desktop, click on the "Start" button. At the Run command line, type D:start.exe then click "OK." (D: is the drive letter for the CD-ROM.)

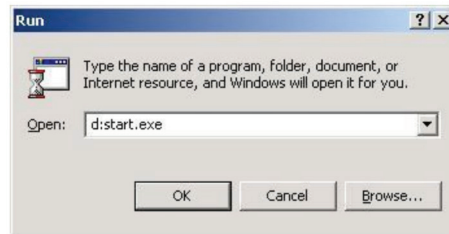


Figure 4-1. The Run Dialog box.

The Install Shield Wizard window will be displayed.

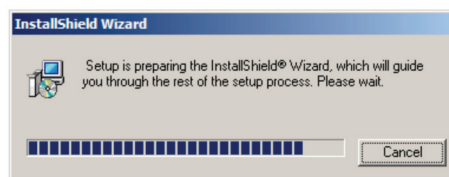


Figure 4-2. The Install Shield Wizard window.

Step 2: When the Serial Server Setup window appears, click "Next."

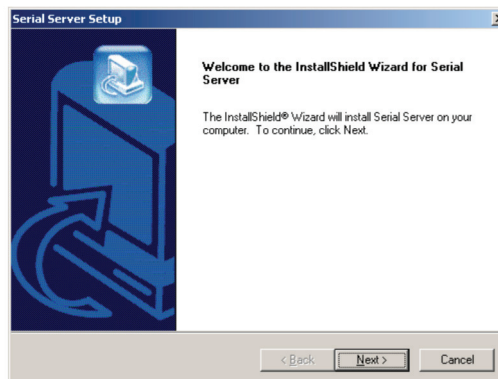


Figure 4-3. Serial Server Setup window.

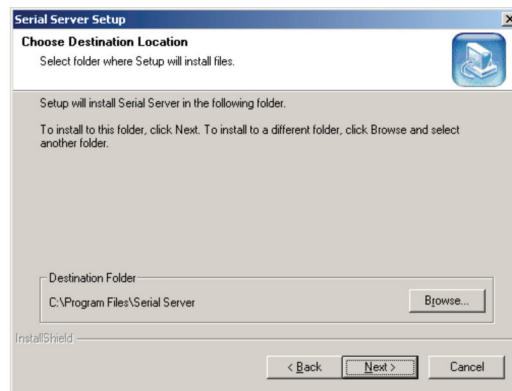


Figure 4-4. The Choose Destination window.

Step 3: When Choose Destination Location appears, click "Next."

The installation progress will be shown until complete.

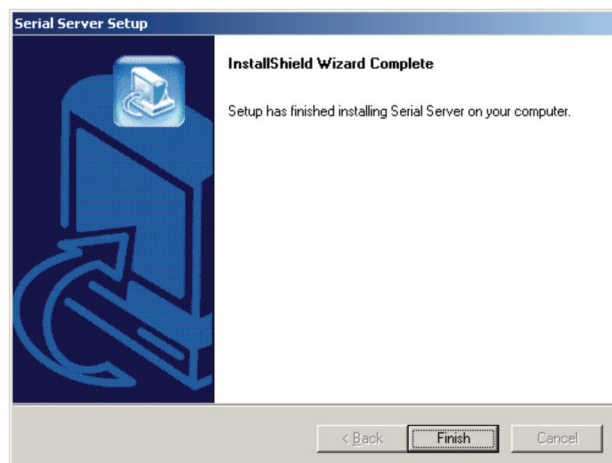


Figure 4-5. The Install Shield Wizard Complete window.

Step 4: Click "Finish" when the Install Shield Wizard Complete dialog appears. When finished, the dialog box will close.

Chapter 4: Installing the Software

4.3 Updating an Existing Installation

If an older version of the Serial Server Manager software is already installed, the “Modify, Repair, or Remove the Program” window will appear when the installation process is initiated:

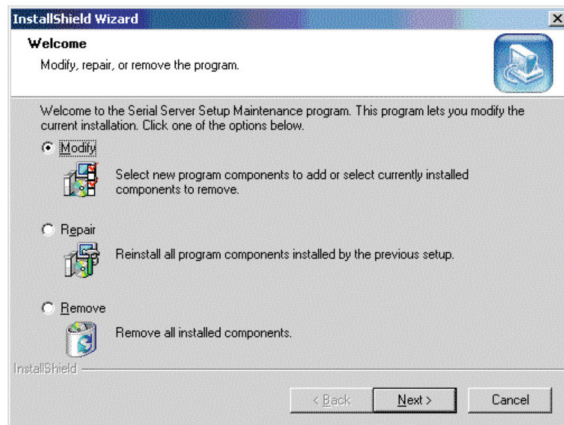


Figure 4-6. The InstallShield Wizard Modify, Repair, or Remove the Program window.

We recommend removing all installed components first. Once the software has been removed, Install the new software.

4.4 Opening the Serial Server Manager software

Step 5: If the Serial Server is not already connected to the network or to the Ethernet port on the computer, connect it. Set the Run/Console switch to the Run position. Apply power.

The Power indicator should light red, the Link light should indicate which type of Ethernet connection has been made, and the Ready LED will flash indicating that configuration can begin.

Step 6: Start the Serial Server Manager software. In Windows Desktop, click:

Start → Programs → Serial Server

As soon as the Serial Server Manager opens, it will initiate Searching Server and after a few seconds the Serial Server List will display all Serial Servers on the network.

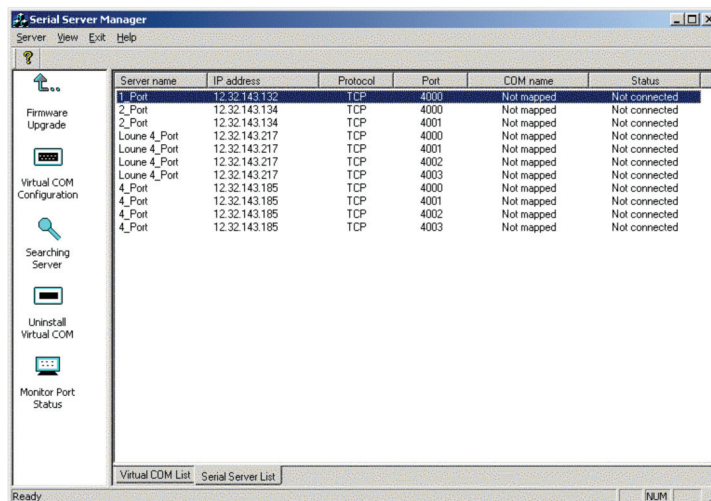


Figure 4-7. Serial Server Manager displaying all Serial Servers.

5. Using Serial Server Manager

The Serial Server Manager software enables:

- Searching for servers connected to the network.
- Displaying and changing the configuration of those servers.
- Installing virtual COM ports on a computer.
- Displaying and configuring virtual COM ports.
- Uninstalling virtual COM ports on a computer.
- Upgrading the serial server firmware.
- Monitoring port status.
- Saving and loading configuration files.

5.1 Hardware Setup

Step 1: Connect the Serial Server to the LAN or to a computer Ethernet port. Set the Run/Console DIP switch on the Serial Server to the Run position.

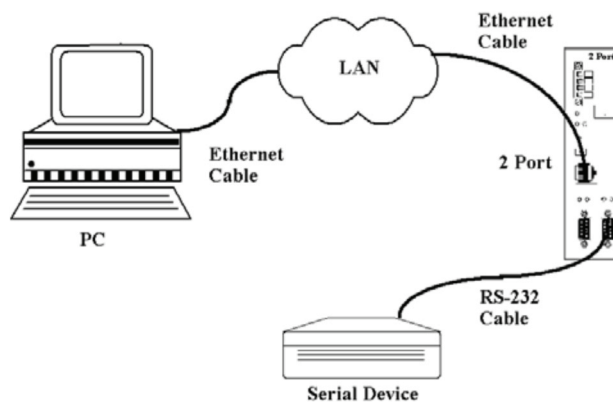


Figure 5-1. Ethernet connection via a LAN.

Chapter 5: Using Serial Server Manager

NOTE: If connecting directly to a computer LAN card, use an Ethernet Crossover Cable (as in Figure 5-2).

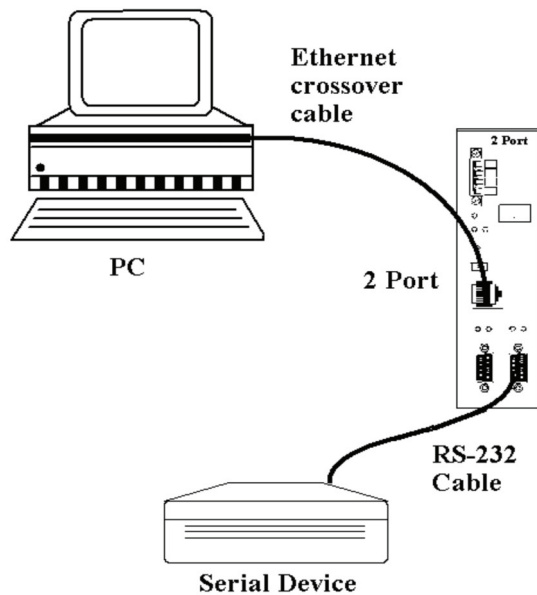


Figure 5-2. Direct Ethernet connection using a crossover cable.

Step 2: Apply power. The red Power indicator will light. The Link indicator lights when an Ethernet connection is made, and the Ready indicator will flash.

5.2 Software Setup

Step 3. To run the Serial Server Manager from the Windows Desktop, click:

“Start → Programs → Serial Server”

As soon as the Serial Server Manager opens, it will initiate Searching Server and after a few seconds, the Serial Server List will display all Serial Servers on the network.

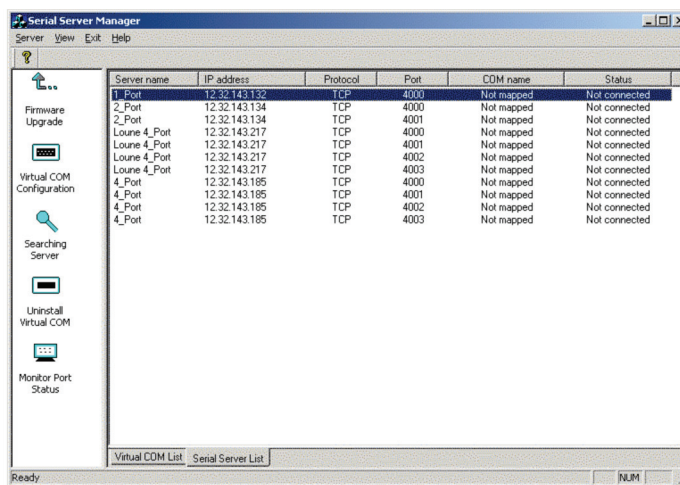


Figure 5-3. The Serial Server Manager window.

5.3 Software Overview

The Serial Server Manager window provides the following information:

- Menus (Server, View, Exit, Help)
- Server Icons (Firmware Upgrade, Virtual COM Configuration, Searching Server, Uninstall Virtual COM, Monitor Port Status)
- Serial Server/Virtual COM Lists
- Software Status (Ready, Updating, Searching, etc.)

5.3.1 Menus

Server

- Firmware Upgrade—Used when downloading new firmware to the Serial Server.

NOTE: See Chapter 9 for more information on upgrading firmware.

- Virtual COM Configuration—Selects the Virtual COM List. Double clicking on any COM port in the Virtual COM List brings up a window that enables changing the virtual COM settings such as Flow Control, Protocol, IP address, and Port Number. Virtual COM settings must match Serial Server port settings.
- Searching Server—Searches for Serial Servers on the network and brings back configuration information that will be displayed in the Server Properties window.
- Uninstall Virtual COM—Enables virtual COM ports to be uninstalled from the Serial Server Manager window.
- Monitor Port Status—Brings up a screen that displays the following information associated with the selected serial port:

Serial TX: Displays the number of bytes of data sent to the serial device since the IP connection was established.

Serial RX: Displays the number of bytes of data received from the connected serial device since the IP connection was established.

DTR/RTS: The DTR/RTS Port Status indicator displays the current logic state of the DTR and RTS hardware handshake (output) lines for the selected Serial Server port (1 = asserted, 0 = not asserted).

DCD/DSR/CTS: The DCD/DSR/CTS Port Status indicator displays the current logic state being received on the DCD, DSR, and CTS hardware handshake (input) lines for the selected Serial Server port (1 = asserted, 0 = not asserted).

Status: Indicates whether the client software has made a connection with the Serial Server.

IP Address: Displays the IP address of the connected client when there is a client connection.

- Save Configuration File—Enables the user to save the current configuration information to a file with a .vcom extension.
- Load Configuration File—Enables the user to load a configuration file.

View

Provides three viewing options for the Serial Server Manager screen:

- Toolbar—enables the toolbar (directly under the menu bar) to be viewable or hidden.
- Status Bar—enables the Status Bar (at the bottom of the screen) to be viewable or hidden.
- Split—enables the position of the split between the Icons pane and the Virtual COM List/Serial Server List panes to be dragged horizontally using the mouse.

Exit

- Allows you to Exit the Serial Server Manager program.

Help

- Accesses the “About vcomui” dialog box, which indicates the software version number.

Chapter 5: Using Serial Server Manager

5.3.2 Server Icons Pane

Firmware Upgrade, Virtual COM Configuration, Searching Server, Uninstall Virtual COM, and Monitor Port Status can also be selected using icons located in the left window.

5.3.3 Serial Server/Virtual COM Lists

To make managing lists of serial servers easier, lists can be sorted by clicking on any tab heading. Scrolling bars help when scrolling through long lists.

Serial Server List

- **Server Name**—Displays the name of the Serial Server. The name is listed once for each port.
- **IP Address**—Displays the IP Address for the Serial Server. All ports in a Serial Server have the same the same IP address.
- **Protocol**—Displays the currently selected TCP or UDP mode for the Serial Server.
- **Port**—Displays the port number for each Serial Server port.
- **COM Name**—Displays the name of the computer COM port mapped to each Serial Server port. If no computer port has been mapped, it displays “Not mapped.”
- **Status**—The Status indicates the mapped virtual COM port condition.
 - Not Connected is shown when a program does not have the port Open.
 - Connected is shown when that mapped port is Open for use.

Virtual COM List

- **COM Name**—Displays the number of the COM port mapped to each Serial Server port.
- **IP Address**—Displays the IP Address for the Serial Server. All ports in a Serial Server have the same IP address.
- **Protocol**—Displays the currently selected TCP or UDP mode for the Serial Server.
- **Port**—Displays the port number for each Serial Server port.
- **Flow Control**—Indicates what type of flow control is configured for each port.
- **Status**—Indicates whether each port is currently In Use or Not Used.

Status Bar

Displays the current status of the software in the bottom, left corner of the screen.

- Ready
- Updating
- Searching reachable servers...

5.4 Search for Servers

Upon opening the Serial Server Manager software, it will automatically execute Searching Server and search for all reachable Serial Servers.

Step 4: To manually initiate a search for servers, click “Searching Servers” (under the Servers menu or the icon on the left side of the screen). The Search Setup box will appear.

It provides two options for searching for servers on the network:

Specify the IP Address of the Serial Server

Search all reachable servers

Step 5: Enter the IP Address assigned to the desired Serial Server or click “Search all reachable servers,” then click “OK.” IP Address is used to find Serial Server units that are not on the same subnet. (Routers on the network will block the standard broadcast used to find servers if Search all reachable servers is selected.) The user must set an IP address that conforms to the LAN addressing scheme.

The Searching window is shown until all active Serial Servers on the LAN are listed in the Serial Server List window.

5.5 Configure Server Properties

The Server Properties window displays the current configuration properties for the currently selected server.

Step 6: To open the Server Properties window, highlight the Serial Server in the Serial Server List window, double-click to open.

The Server Properties window is used to configure and store the Server configuration settings. Details for setting Properties are described in the next chapter.

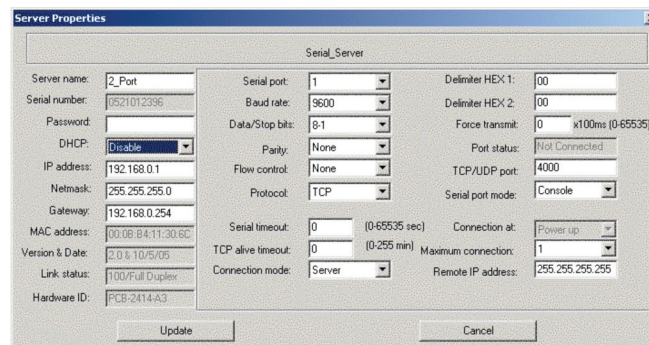


Figure 5-4. The Server Properties window.

NOTE: Serial Server Manager Navigation:

- Use the mouse to select the property and parameters or
- Tab to move to the next property
- Tab+Shift to move back to previous property
- Arrows to move between properties or change values or contents of the current property
- Enter to select update or cancel

Step 7: After configuring as needed, click “Update” to store the configuration in the server.

Step 8: Click “Yes” to restart. A dialog box will appear indicating that the server is restarting, then a dialog box will ask whether you want to search for all reachable servers again.

Step 9: Click “Yes.”

After the port has been updated, you may want to re-enter Server Properties to verify the changes have taken effect, or to view/change the configuration of other ports. Each port must be configured separately.

Chapter 6: Configuring the Serial Server Properties

6. Configuring the Serial Server Properties

The Serial Server can be configured using any of four different user interfaces: the Serial Server Manager software, Console Mode, Telnet, or the Web Server. The Server Properties described in this chapter can be changed from any of these user interfaces.

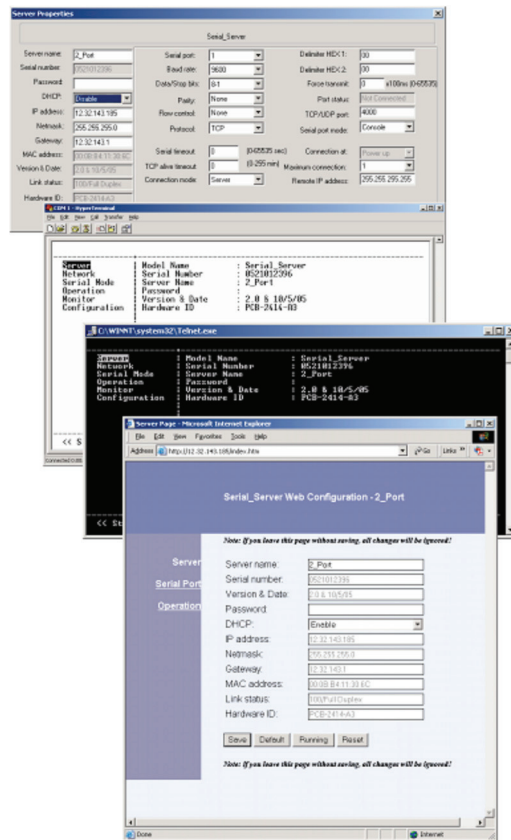


Figure 6-1. The four methods of configuring server properties.

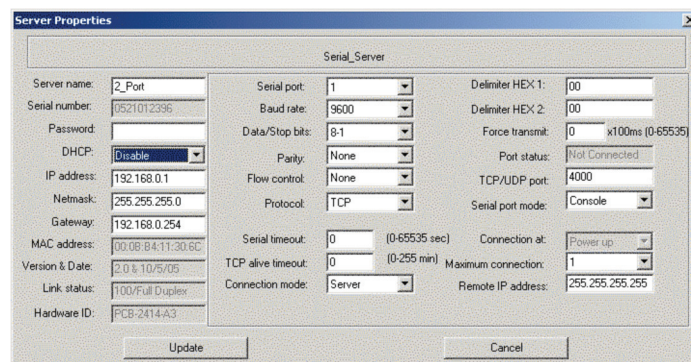


Figure 6-2. Serial Server Manager Server Properties window.

Server Name

This field displays the name that has been assigned to the Serial Server. You can enter a new Server Name of up to 16 characters. If more than one Serial Server is connected on the LAN, we recommend that you assign a new name to each. When the Serial Server Manager finds a Serial Server on the LAN, it displays the server name and IP Address, enabling the user to distinguish between Serial Servers.

Serial Number

Each Serial Server has a unique serial number. It is fixed and cannot be changed.

Password

Entering a password activates a security feature on the Serial Server. Once a password is entered, it will be required to access the menu and make changes.

DHCP

DHCP servers are a part of numerous LAN management systems. The DHCP field provides two choices: Disable and Enable. Disable is the normal, or default, setting. When enabled, the Serial Server will send a DHCP request to the DHCP server, which will assign a dynamic IP address, net mask, and gateway to the Serial Server. If a DHCP server is not available on the network, the Serial Server will time out after 10 seconds and the default values will remain. When DHCP is enabled, the IP Address, Netmask, and Gateway fields become inaccessible and cannot be changed by the user.

NOTE: A dynamic address assigned by the DHCP server may change if the server loses the Ethernet connection or power is removed. The host (client) communication software requests a connection to the specific IP address of the serial server. If the DHCP reassigns a different IP address, the software will not be able to communicate with the hardware. Therefore, we recommend using a static IP address.

IP Address

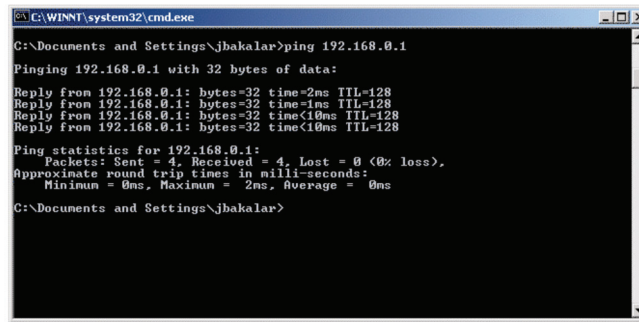
Software or hardware attempting to access the Serial Server via the network must know the IP address of the server. A static IP address is retained and remains the same each time the server is powered up or starts/restarts. The default IP address of the Serial Server is printed on a label on its bottom cover. Entering an appropriate address in the IP Address field and updating the server will change the server's IP address. The network administrator can assign/establish the static address or group of addresses to be used.

The IP address of the Serial Server can be confirmed using the DOS Ping command.

NOTE: To use Ping to check for communications:

- Access a DOS window (in XP click "Start," then "Run").
- At run prompt enter: CMD.
- In the DOS window enter: Ping xxx.xxx.xxx.xxx (IP address for the server to be confirmed).
- The command will return the Ping results indicating four replies.

Chapter 6: Configuring the Serial Server Properties



```
C:\WINNT\system32\cmd.exe
C:\Documents and Settings\jbakalar>ping 192.168.0.1
Pinging 192.168.0.1 with 32 bytes of data:
Reply from 192.168.0.1: bytes=32 time=2ms TTL=128
Reply from 192.168.0.1: bytes=32 time=1ms TTL=128
Reply from 192.168.0.1: bytes=32 time<10ms TTL=128
Reply from 192.168.0.1: bytes=32 time<10ms TTL=128

Ping statistics for 192.168.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms
C:\Documents and Settings\jbakalar>
```

Figure 6-3. Pinging using the DOS command window.

Netmask

The default LAN netmask is configured for a Class C address. The user may change this. The default is 255.255.255.0.

Gateway

The gateway IP address allows users to access the Serial Server from outside the LAN.

MAC Address

The MAC address is fixed and cannot be changed. It is assigned in the factory. Every Ethernet device manufactured has its own unique MAC address.

Version and Date

The currently loaded version of the firmware, and when it was released, is shown here.

Link Status

Link status automatically displays the type of Ethernet connection. It will either display 10BASE-T or 100BASE-TX in full-duplex or half-duplex. This will depend on the LAN, switches, and hubs used in the LAN topology.

Server Serial Port

This field indicates the number of the port for which Serial Server properties are currently being displayed. Changing the number in this field will cause all the other fields to display the properties for the specified port.

NOTE: Before changing ports, any changes to properties must be Updated (Saved) or the unit will not retain them.

Baud Rate

The serial port baud rate on the Serial Server must match the serial baud rate of the connected device unless using Virtual COM Mode. In Virtual COM Mode, the software program will establish serial settings.

Data/Parity/Stop

Set this to match the data format used by the serial device connected when Virtual COM Mode is not being used.

Flow Control

The Flow Control setting must match the requirements of the serial device connected.

NOTE: Select "None" when setting the port as RS-485 or 4-wire RS-422.

TCP/UDP Protocol

Select TCP (Transmission Control Protocol) or UDP (User Datagram Protocol) protocol. If the application does not require a UDP connection, select TCP. TCP guarantees reliable communication with error checking, whereas UDP provides faster transmission.

UDP Mode

When UDP mode is chosen, the Serial timeout, TCP alive timeout, Connection mode, Connection at, Max connection, and Remote IP address fields are replaced with the following fields: Destination IP address range, Port number, and Source IP address range. In this mode, you can configure the server to broadcast data to and receive data from multiple IP addresses. Four IP address range fields are provided.

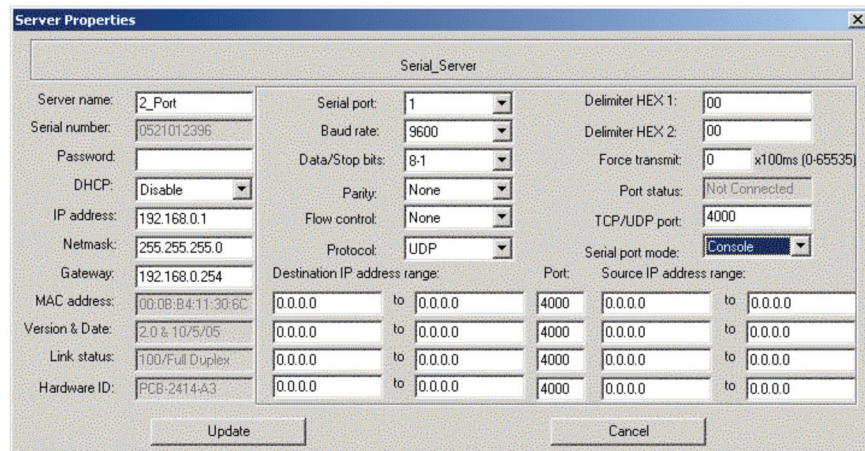


Figure 6-4. The Server UDP Configuration screen.

Serial Timeout

Default for the Timeout property is 0, or no timeout. Setting Timeout to any value between 1 and 65535 seconds activates it. If Timeout is set to 5 seconds and the Serial Server is configured as a Server, the Client makes a connection and communications starts. If communications are ideal for 5 seconds, the Serial Server will reset and make itself available for another client connection.

TCP Alive Timeout

The Serial Server monitors TCP activity. If TCP activity stops for the length of time specified in this field, the connection will be closed. This field can be set to any value between 0 and 255 minutes. If zero, or no value, is entered into this field, the server will not disconnect.

Connection Mode

The Connection Mode field has three options: Server, Client, and Client (no heartbeat). When Client or Client (no heartbeat) is selected, the Connection at field automatically becomes active (allowing the user to select Power up or Data Arrival).

- When using the Virtual COM Port feature, select Server.
- When using a TCP or UDP Socket program, select Server.
- When using Paired Mode communication between two serial servers, set up one as a Client and the other as a Server.
- When connecting to a server that does not support Heartbeat, select Client (no Heartbeat).

Delimiter HEX 1 and Delimiter HEX 2

These fields allow the user to enter two ASCII characters (in hex format) that delimit the beginning and end of a message. When a message with both these delimiters is received at the serial port, the data contained in the serial buffer is placed in an Ethernet packet and sent out the Ethernet port. If only Delimiter 1 is set (Delimiter 2 is zero or blank), upon receiving Delimiter 1 the Serial Server will put all the data in the serial buffer in an Ethernet packet and send it out the Ethernet port. If serial data greater than 1 kilobyte is received, it will automatically be placed in an Ethernet packet and sent out the Ethernet port.

Chapter 6: Configuring the Serial Server Properties

Force Transmit

This field allows the user to set a maximum time limit between transmissions of data. The value set in this field multiplied by 100 ms determines the Force Transmit time. When the elapsed time reaches the time configured in this field, the TCP/IP protocol will pack the data currently in the serial buffer into a packet and send it out the Ethernet port.

Port Status

This field indicates whether a serial port is connected via the Serial Server to a virtual COM port of a device on the network.

TCP/UDP Port

This sets the port number for connection. The default port number for the 1-Port Industrial Serial Server serial port is 4000. The default port numbers for serial ports 1 and 2 are 4000 and 4001.

In all modes of operation, Direct IP or Virtual COM, the port number set in the Server Properties menu must match the Virtual COM or socket software port settings.

NOTE: Example: The Virtual COM default setting is TCP/UDP Port 4000. If the port # property is changed to 4001, the virtual COM port will have to be changed to 4001. The hardware settings can be changed from the Serial Server Manager or Console Configuration Menu. The Virtual COM port setting can also be changed within the Device Manager of the computer on which it is installed.

Serial Port Mode

Serial Port Mode allows configuration of the serial server for the following modes of operation:

- **Console**—When this mode is selected and the server is updated, a PC running a communications program such as HyperTerminal can communicate with the Serial Server via the Console Mode serial port (Port 1 of each Serial Server), displaying the Server Properties screen and enabling configuration of the server and its ports.
- **Upgrade**—When this mode is selected and the server is updated, firmware can be uploaded into the Serial Server via the Console Mode serial port or a virtual COM port mapped to the number of the Console Mode serial port.
- **Default**—When this mode is selected and the server is updated, it will revert the server to its default configuration.
- **RS-232**—When this mode is selected and the server updated, the selected serial port will become an RS-232 serial port on the server.
- **RS-422**—When this mode is selected and the server updated, the selected serial port will become an RS-422 serial port on the server.
- **RS-485H**—When this mode is selected and the server updated, the selected serial port will become a two-wire, half-duplex RS-485 serial port on the server.
- **RS-485F**—When this mode is selected and the server updated, the selected serial port will become a four-wire, full-duplex RS-485 serial port on the server.

Connection At

When the Connection Mode field is set to Client or Client (no heartbeat), this field becomes active, allowing the Serial Server (acting as a client) to connect to the server either on Power up or on Data Arrival (first character arriving).

Max Connection

This field allows the user to configure the Serial Server to have up to eight TCP connections.

Remote IP Address

This is a security feature activated by entering the IP address of the desired client. The Serial Server will only communicate with the listed IP address and all other requests for connection will be filtered out. The Serial Server must be set up as a TCP or UDP Server to use this feature. The default setting is 255.255.255.255.

If Paired Mode is not being used, do not change this setting until the application has been tested and is communicating properly. Then activate the address filtering feature.

NOTE: Refer to Section 2.3.3, Paired Mode.

Update/Save

Server properties must be updated separately for each serial port. Updating varies slightly, depending on which of the four configuration user interfaces are used.

Updating the Server Properties in Serial Server Manager

From the Server Properties screen, click the “Update” button to store the configuration settings for the currently selected port. The vcomui dialog box will appear, indicating you must restart the device before the new settings will take effect. Click “Yes.” After several seconds, a dialog box will ask whether you want to search for all reachable servers again. Click “Yes.”

After that port has been updated, you may want to re-enter Server Properties to verify the changes have taken effect, or to view/change the configuration of other ports. Each port must be configured separately.

Saving Configuration Data in Console Mode or Telnet

Saving (updating) server properties is done from the Configuration screen. Access the Configuration screen by tabbing through the list of screens on the left side of the window and highlighting Configuration.

There are four options shown on the right side of the Configuration screen: Save, Default, Running, and Reset. Use Tab, Backspace, or arrow keys to move the cursor to the option position, and then press “Enter.”

- Save stores the configuration data to the Serial Server flash memory and resets it.
- Default restores the configuration data to factory default settings.
- Running restores the configuration data to the last values stored in the flash memory.
- Reset re-boots the Serial Server, making it available for a client connection.

Web Server Interface

- The Web Server interface provides the same updating options as Console Mode and Telnet. These are located at the bottom of all three Web Server pages. If a field is changed, you must click “Save” before leaving that page, or the changes will be ignored.

NOTE: If you leave any Web Server page without saving, any changes you have made will be ignored.

7. Installing Virtual COM Ports

The Virtual COM Port feature allows Windows platform software, using standard API calls, to be used in an Ethernet application.

The Install Virtual COM Port software adds a Serial Server (COM#) port to the computer. This shows up in the Device Manager. The COM number can be selected from a list of available numbers. For example, in a computer already having a COM 1 and COM 2, COM 3 to COM 254 are available for the Serial Server. We recommend that you select COM Port 5 or higher. The virtual COM port looks like a standard COM port to most Windows based applications. This enables the software to open a connection with the serial port located anywhere on the LAN/WAN. When using the virtual COM port, the Serial Server is configured as a TCP or UDP Server.

7.1 Virtual COM Port Installation

Step 1: From the Windows Desktop, click:

“Start —> Programs —> Serial Server”

The Search Setup window will appear.

Step 2: Select the “Search all reachable servers” checkbox, then click “OK.”

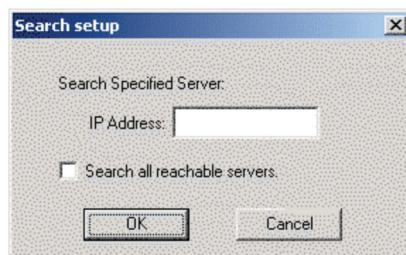


Figure 7-1. The Search Setup window.

The program searches the LAN for all available Serial Servers. When complete, the Found Server window appears and displays a list of the servers that were found.

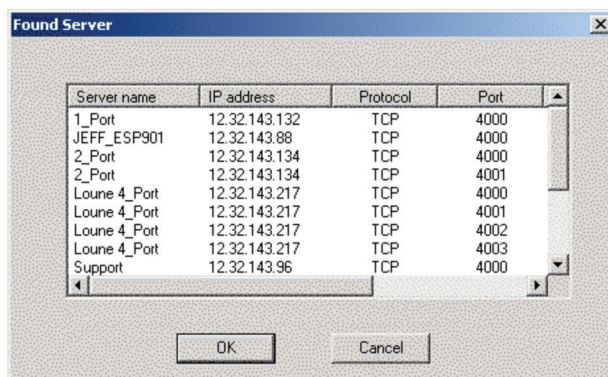


Figure 7-2. The Found Server window.

Step 3: Select the Serial Server at the IP Address to be mapped to a virtual COM port, then click “OK.”

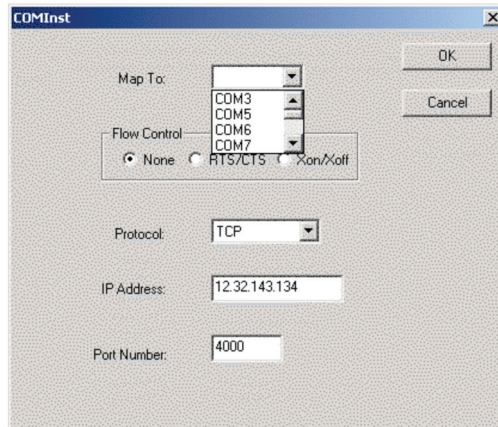


Figure 7-3. The COMInst window.

Step 4: In the Map To: field, select the number of the virtual COM port to be assigned. The default Flow Control setting is None. RTS/CTS can be selected if used by the application program and serial hardware. The Serial Server must be set to match. The protocol TCP/UDP, IP address, and port number will mirror the settings of the selected serial server. Click "OK."

NOTE: PCs may have hardware COM ports and devices such as modems, IR ports, or USB-based COM ports that are not currently connected. Try selecting a COM number above COM s4 if problems occur.

Windows XP provides a notice concerning Windows Logo testing for XP.

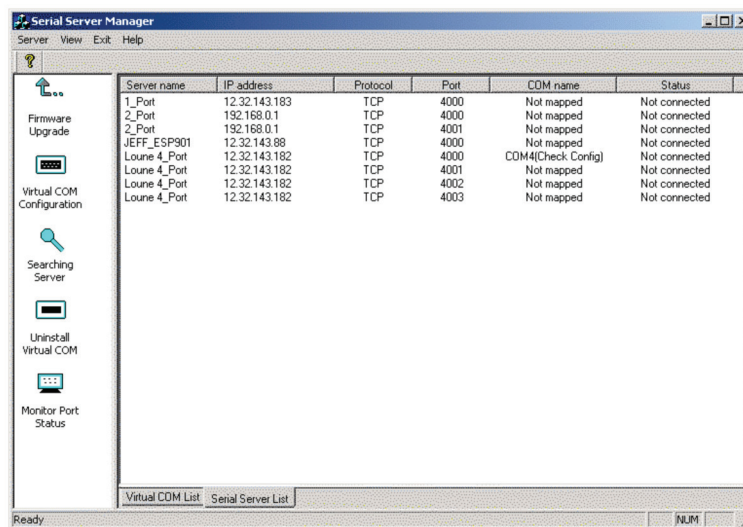


Figure 7-4. The Windows Logo Testing window.

This XP feature simply indicates that these drivers have not yet undergone the Microsoft® testing procedures required to use the Windows XP Logo on the packaging. Driver compatibility is not affected.

Step 5: Click "Continue Anyway" to proceed with the installation.

Step 6: After setting all Serial Server serial ports as virtual COM ports, click "Cancel" on the Found Server form.

Chapter 7: Installing Virtual COM Ports

7.2 Matching the Serial Server and Virtual COM Port Settings

The settings of the virtual COM ports in the Device Manager and the Serial Server Configuration Menu must match. If the settings do not match, the virtual COM ports will not work. If these settings are changed in the Device Manager, it will only affect the operation of the virtual COM port. It will not change the settings stored in the Serial Server. Use the Serial Server Manager to change the Serial Server settings.

Step 1: Use Device Manager to View New Ports.

Confirm the virtual COM ports in the Device Manager.

Step 2: Double-click "Ports" to view the list of COM port numbers.

The installed Virtual COM port will be displayed as Serial Server (COM #).

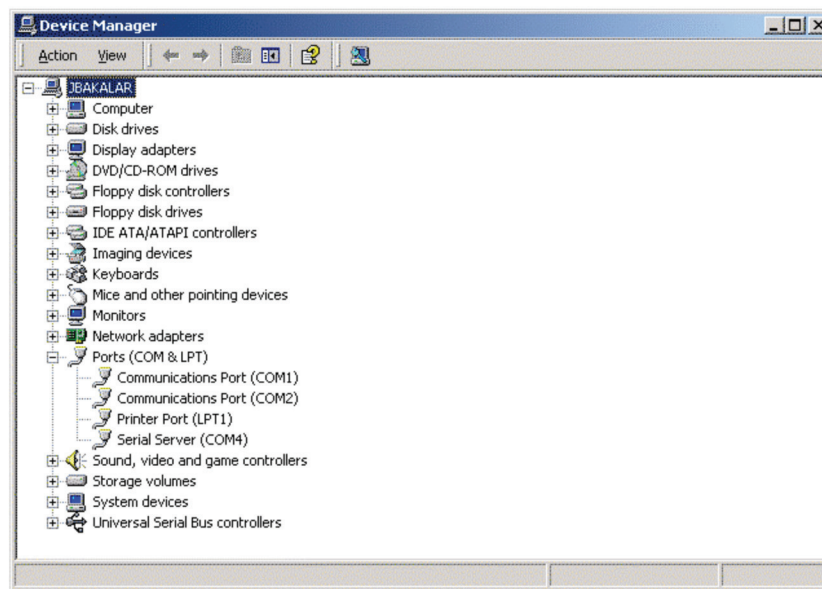


Figure 7-5. The Device Manager Window.

Step 3: In the Device Manager, select a Serial Server COM#. Double-click it to bring up the Properties window.

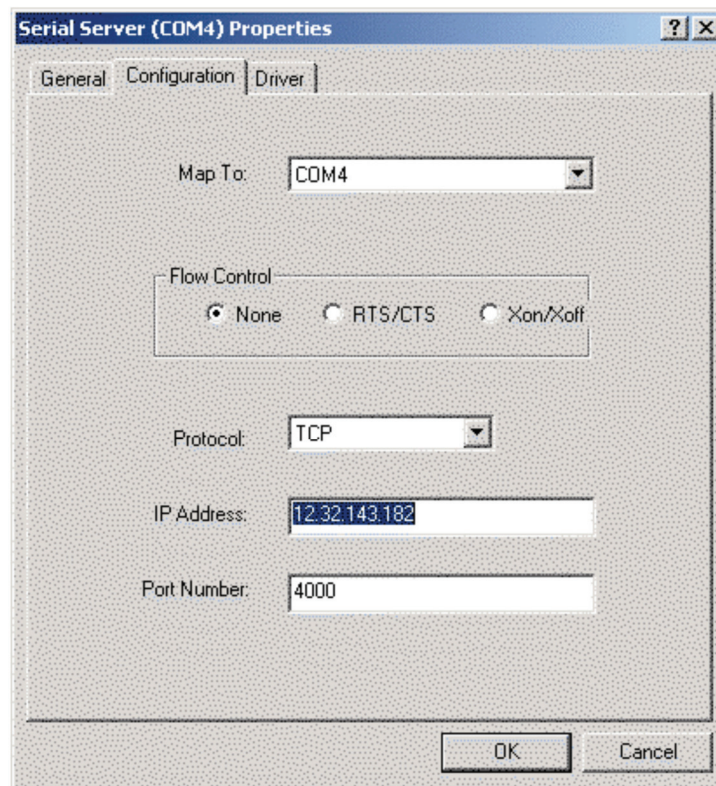


Figure 7-6. The Serial Server (COM3) Properties window.

Step 4: Click the "Configuration" or "Port Settings" tab. This screen allows the settings to be changed if necessary. Click "Cancel" to keep the existing settings.

Step 5: Click "OK" to change the settings. Use Refresh in the Device Manager if Windows does not auto refresh.

Chapter 8: Removing Virtual COM Ports

8. Removing Virtual COM Ports

8.1 Using Serial Server Manager

Step 1: From the Windows Desktop, click:

“Start —> Programs —> Serial Server”

Step 2: In the Serial Server Manager window, click the Virtual COM List tab. Highlight the mapped COM port number to be removed.

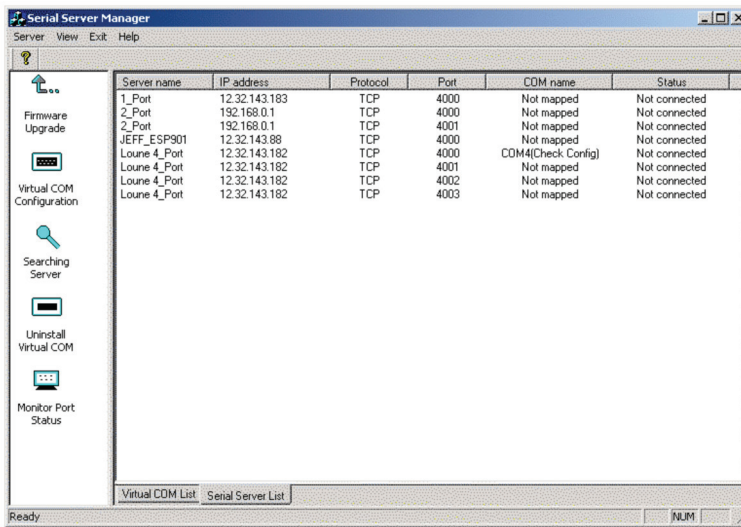


Figure 8-1. The Serial Server Manager window.

Step 3: Click the “Uninstall Virtual COM” icon. The Manager will ask for conformation. Click “OK” to complete the uninstall procedure.

8.2 Using Device Manager

NOTE: The screen shots were taken from a Windows XP operating system.

Step 1: From the Windows Desktop click:

“Start —> Settings —> Control Panel”

Step 2: Click the System icon when the manager window opens.

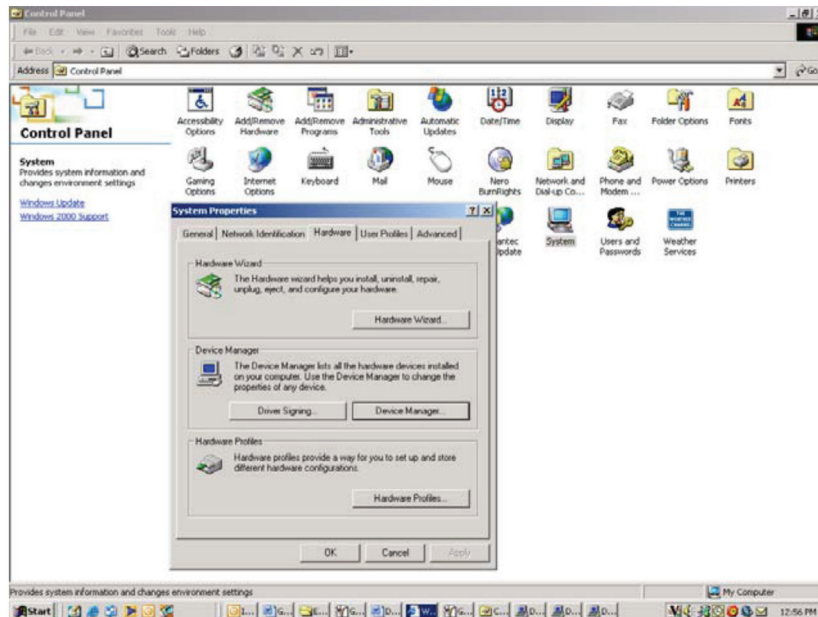


Figure 8-2. The Control Panel window.

Step 3: Click "Device Manager" in the Systems Properties window. In the Device Manager dialog box, click the "+" next to Ports (COM LPT) to expand.

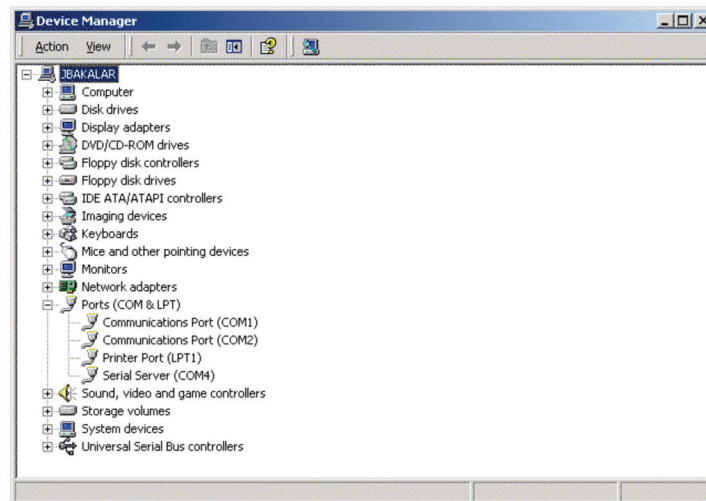


Figure 8-3. The Device Manager window.

Step 4: Highlight Serial Server (COM#) to be removed and click the "Action" tab at the top of window, then click "Uninstall." A Confirm Device Removal window will appear.

Chapter 8: Removing Virtual COM Ports

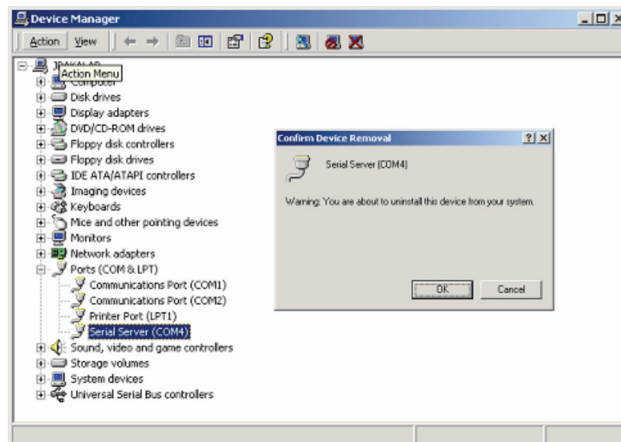


Figure 8-4. Confirm Device Removal.

Step 5: Click “OK” to proceed.

The Serial Server (COM#) will be removed and the Device Manager window will refresh and display the remaining COM ports.

9. Upgrading the Serial Server Firmware

New Serial Server firmware updates may become available through the Black Box Web site (www.blackbox.com) for installation into the server. The firmware can be uploaded using either a virtual COM port connection or hardware COM port connection.

9.1 Downloading the Firmware

Make a folder to receive the firmware file. Download the compressed software file from www.blackbox.com. Unzip or expand the file into the (.hex) format so it will be ready to upload to the Serial Server.

9.2 Upgrading Via Serial Server Manager

The Serial Server Manager software can upload new firmware to the server using a direct PC connection via the 1-Port Industrial Serial Server serial port, 2- or 4-Port Industrial Serial Server Port 1, or using a virtual COM port.

NOTE: If connecting directly to a computer serial port, use a null-modem cable between the computer RS-232 port and Port 1 of any of the Industrial Serial Server serial ports.

9.2.1 Preparing the Software

Step 1: In the Serial Server Manager Serial Server List window, double click the server to be upgraded. The Server Properties window will appear.

Step 2: If using a direct connection to upload the firmware to the Serial Server, set the baud rate to 115200 for the fastest possible upload.

Step 3: Set the Serial Port field to upgrade and click the "Update" button. (Make sure that the Run/Console switch is in the Run position.)

Step 4: Click "Yes" on the vcomui dialog to restart the Serial Server.

9.2.2 Upgrading the Firmware

Step 5: Double-click the Firmware Upgrade icon (or click the Server menu and Firmware Upgrade).

Step 6: In the Upgrade window, click "Browse." The Open dialog box will appear. Locate the folder on your PC that contains the firmware .hex file. Select the file and click "Open." The Open dialog box will disappear.

Step 7: In the Upgrade window, select the serial port to be used in transferring the firmware.

If connected directly from the PC to a Serial Server port, it will typically be COM1 or COM2.

If using a virtual COM port to upgrade via the network, identify the virtual COM number and address mapped to Port 1 on the Serial Server.

Step 8: Click "Upgrade."

Step 9: In the Port Settings window, set the bits per second, data bits, parity, and stop bits to the same values as set up in the Server Properties window. Click "OK."

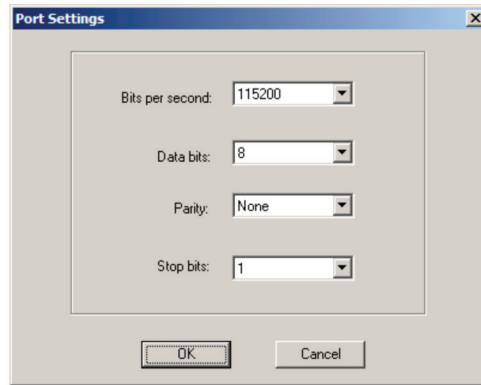


Figure 9-1. The Port Settings window.

Step 10: Upgrade progress will be shown until the Upgrade finished! message is shown. Click "OK."

10. Using Console Mode

Before the Serial Server is installed on a LAN, the Console Mode can be used to change the settings from the defaults. The Serial Server is shipped in the RS-232 Mode. Connect a crossover (null-modem) cable between the COM port on the computer and the appropriate serial port on the Serial Server.

NOTE: See Chapter 6 for details of each server property settings.

Console Mode Setup

Step 1: Apply power to the Serial Server. The Power LED will light and the Ready LED will flash.

Step 2: Using a VT100 Terminal emulation program (typically HyperTerminal in Windows), open the computer COM port connected to the Serial Server (via an RS-232 crossover cable).

Step 3: In the HyperTerminal Port Settings window set:

Baud rate: 9600

Data bits: 8

Parity: None

Stop bits: 1

Flow control: None

Click "OK."

Step 4: Make sure that the Run/Console switch is in the Console position.

Step 5: To view the Configuration Menu, press the space bar. The menu will appear within a few seconds.

Navigating the Configuration Menus

There are six Console Mode screens: Server, Network, Serial Mode, Operation, Monitor, and Configuration. Use Tab, Backspace, and arrow keys to highlight the desired function on the screen list. Pressing "Enter" moves the cursor to the first field with the current screen. The configuration fields can be changed by pressing Enter and selecting from the list that appears. The Escape key moves the cursor back to the screen list. Pressing the Space Bar refreshes the page.

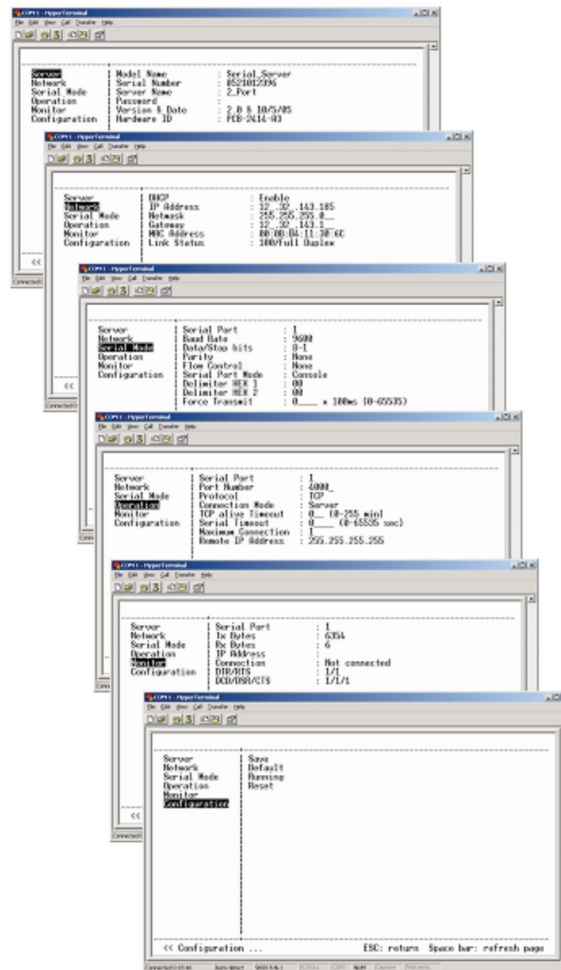


Figure 10-1. Console Mode Configuration screens.

Step 6: Once all the changes have been made, move to the Configuration screen, select "Save" and press "Enter."

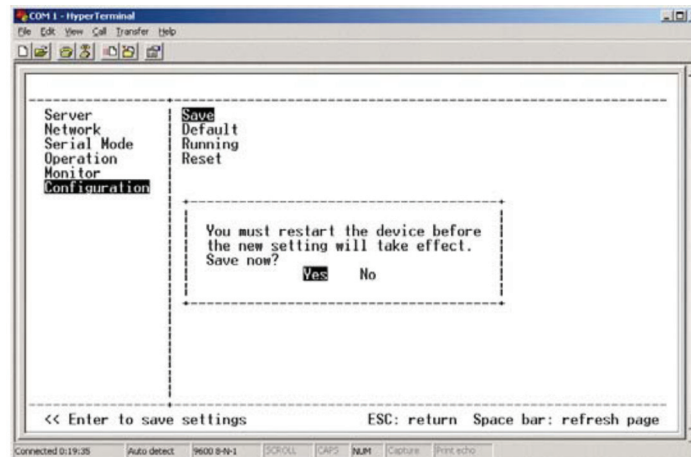


Figure 10-2. Saving and restarting the configuration.

The restart message will appear.

Step 7: Select "Yes" to save changes. This is necessary to write the settings to the server.

Using a Password

If a password is used, you must enter it before the Configuration screen will appear. If the server is accessed with a password but no changes are made, Reset to end before disconnecting.

11. Using the Web Server

The Web Server can be used to configure the Serial Server from any Web browser software (such as Internet Explorer). Server properties can be set up using three browser pages.

NOTE: See Chapter 6 for details on server properties.

Setting Server Properties

In Internet Explorer, type the IP address of the Serial Server into the address field near the top of the window and press the Enter key. The following window will appear:

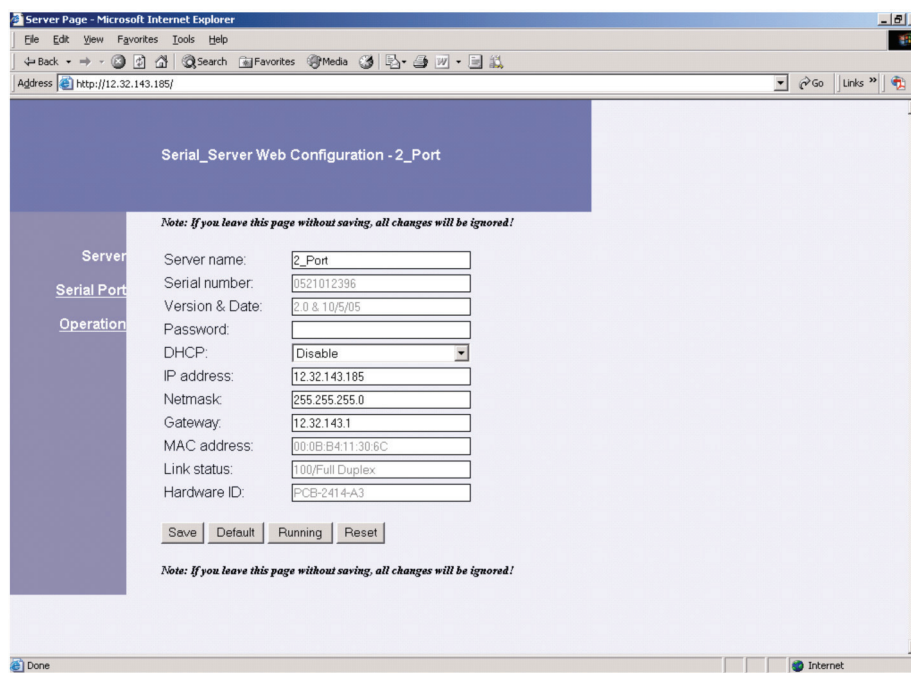


Figure 11-1. The Web Server page.

Navigate and change properties as required using the mouse and keyboard.

To change serial port properties, click “Serial Port” on the left side of the browser window. The following page will appear:

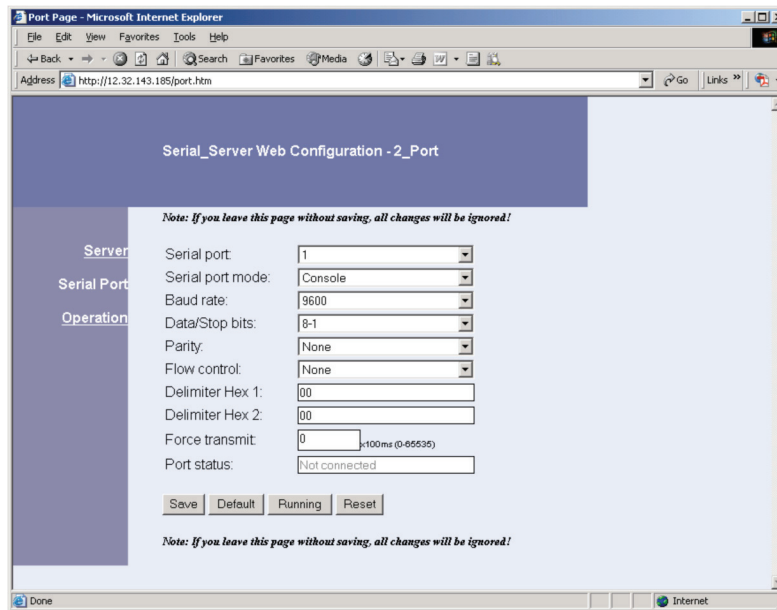


Figure 11-2. The Web Server Serial Port Properties page.

To change other operational properties, click “Operation” on the left side of the browser window. The following page will appear:

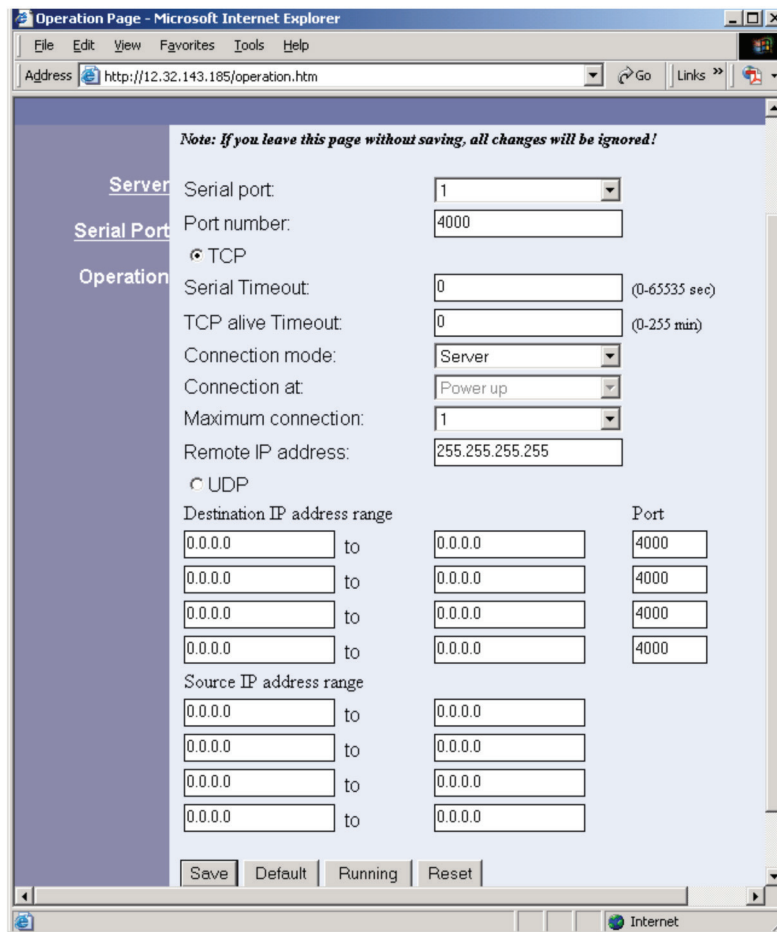


Figure 11-3. The Web Server Operation page.

Click "Save" to store changes to the Serial Server. Settings for each port must be saved separately.

NOTE: If new property settings are not saved before leaving this page, they will not take effect.

Return to the main Server page by clicking on "Server" on the left side of the browser window.

12. Using Telnet

You can use Telnet to configure the Serial Server from any PC on the LAN. The Telnet window displays the same configuration information shown in Console Mode and allows server properties to be configured.

NOTE: See Chapter 6 for details on Server Properties.

Configuration Using Telnet

Step 1: Make sure that the PC and Serial Server are connected to the LAN.

Step 2: Apply power to the Serial Server. The power and ready LED will light.

Step 3: Make sure Serial Server is in Run Mode. If the Run/Console switch is in the Console position, switch it to the Run position. The Serial Server will revert to the operational mode it was in before the switch was set to Console.

Step 4: From the Desktop, click "Start," then "Run." The Run dialog box will open.

Step 5: Type in Telnet and the IP address of the Serial Server to be configured, then click "OK."

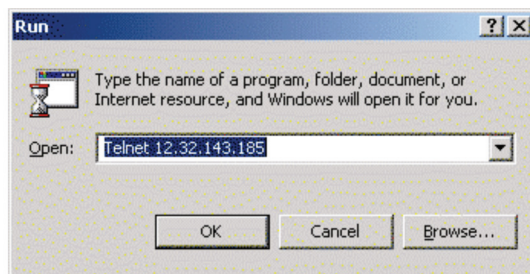


Figure 12-1. The Run Dialog box.

NOTE: The Serial Server must be in RS-232, RS-422, or RS-485 mode before you can Telnet to it and access the configuration screens. If it was last configured in Console mode, you may not be able to access it using Telnet. In this case, use Serial Server Manager, Console Mode, or Web Server for configuration.

Step 6. The Telnet window will open (unless the server is still in Console mode) and the Server screen will appear.

Navigating the Configuration Menu

There are six Telnet screens: Server, Network, Serial Mode, Operation, Monitor, and Configuration. Use Tab, Back Space and arrow keys to highlight the desired function on the screen list. Pressing Enter moves the cursor to the first field with the current screen. The configuration fields can be changed by pressing Enter and selecting from the list that appears. The Escape key moves the cursor back to the screen list. Pressing the Space Bar refreshes the page.

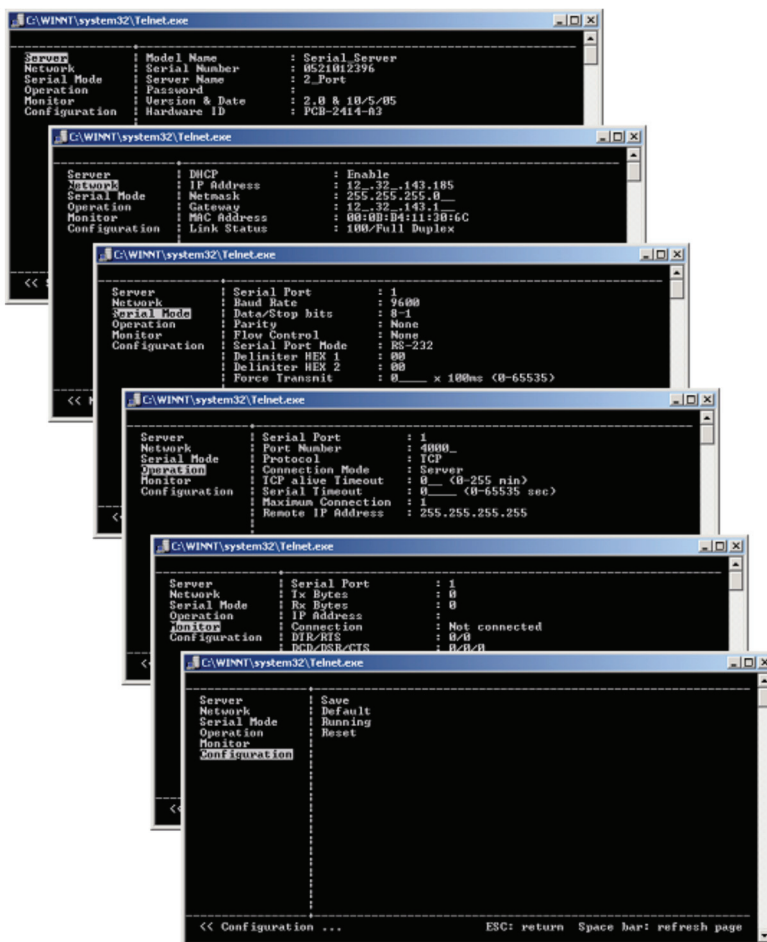


Figure 12-2. Telnet Configuration screens.

Step 7: Once all the changes have been made, move to the Save field and select "Enter." The restart message will appear.

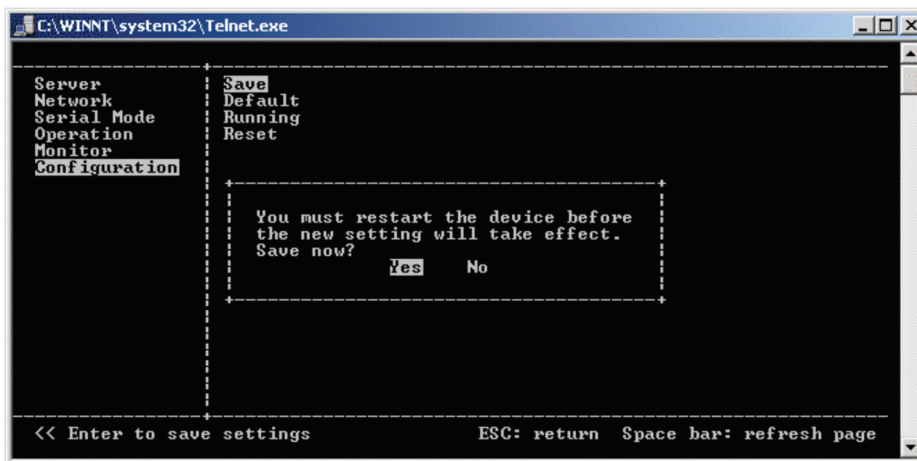


Figure 12-3. Saving and Restarting the Configuration

Step 8: Select "Yes" to save changes. This is necessary to write the settings to the server. The Telnet window will disappear.

Step 9: To view the changes, re-enter Telnet and re-establish communications. The configuration menu will appear and display the current settings.

Appendix A. RS-232 Connections

A.1 2- and 4-Port Serial Server DB9 Pinouts in RS-232 Mode

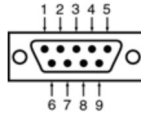


Figure A-1. DB9 connector.

Table A-1. DB9 connector pinout.

RS-232 Signal Name	DTE	RS-232	DB9 M Pin
Carrier Detect	In	DCD	1
Receive Data	In	RXD	2
Transmit Data	Out	TXD	3
Data Terminal Ready	Out	DTR	4
Signal Ground	—	GND	5
Data Set Ready	In	DSR	6
Request To Send	Out	RTS	7
Clear To Send	In	CTS	8
Ring Indicator	In	RI	9

A.2 1-Port Serial Server Terminal Block Pinout in RS-232 Mode

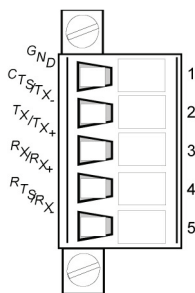


Figure A-2. Terminal block connector.

Table A-2. 1-Port Serial Server Terminal Block Pinout in RS-232 Mode.

RS-232 Signal Name	DTE	RS-232	Terminal
Signal Ground	—	GND	1
Clear To Send	In	CTS	2
Transmit Data	Out	TXD	3
Receive Data	In	RXD	4
Request To Send	Out	RTS	5

Appendix B. RS-422/485 Connections

B.1 2- and 4-Port Serial Server DB9 Pinout in RS-422 Mode

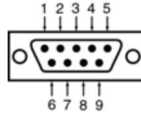


Figure B-1. DB9 connector.

Table B-1. RS-422 connections in a DB9 connector.

RS-232 Signal Name	Direction	RS-422	DB9 M Pin
Receive Data A (-)	In	RXDA (-)	1
Receive Data B (+)	In	RXDB (+)	2
Transmit Data B (+)	Out	TXDB (+)	3
Transmit Data A (-)	Out	TXDA (-)	4
Signal Ground	—	GND	5
Clear To Send A (-)	In	CTSA (-)	6
Clear To Send B (+)	In	CTSB (+)	7
Request To Send B (+)	Out	RTSB (+)	8
Request To Send A (-)	Out	RTSA (-)	9

B.2 1-Port Serial Server Terminal Block Pinout in RS-422 Mode

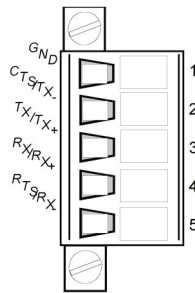


Figure B-2. Terminal block connector.

Table B-2. 1-Port serial terminal block pinout in RS-422 mode.

Signal Name	RS-422	RS-232	Terminal
Signal Ground	—	GND	1
Transmit Data (-)	TXD(-)	Out	2
Transmit Data (+)	TXD(+)	Out	3
Receive Data (+)	RXD(+)	In	4
Receive Data (-)	RXD(-)	In	5

In the RS-422 mode, TXD lines are outputs and RXD lines are inputs. Connect the Serial Server TXDB(+) line to the RXDB(+) line of the serial device, and the Serial Server TXDA(-) to the RXDA(-) of the serial device.

If flow control is set for RTS/CTS, connect the Serial Server RTSB(+) to CTSB(+) of the serial device and the Serial Server RTSA(-) line to the CTSA(-) of the serial device. Connect from the Serial Server CTSB(+) line to the RTSB(+) of the serial device and from the Serial Server CTSA(-) line to the RTSB(+) line of the serial device.

If connecting to receive-only RS-422 devices, connect from the Serial Server TXDB(+) and TXDA(-) lines to the receive pairs on all serial devices.

Ground is signal ground and provides a common mode reference for the RS-422 receiver and transmitters.

Appendix C: RS-485 Connections

Appendix C. RS-485 Connections

C.1 1-, 2-, or 4-Port Serial Server DB9 Pinout in RS-485H (Two-Wire, Half-Duplex) Mode

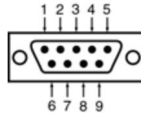


Figure C-1. DB9 male connector.

Table C-1. DB9 pinout in RS-485H mode.

RS-485 Signal Name	Direction	RS-485	DB9 M Pin
Data B (+)	In/Out	DATA B (+)	3
Data A (-)	In/Out	DATA A (-)	4
Signal Ground	—	GND	5

C.2 1-, 2-, or 4-Port Serial Server DB9 Pinout in RS-485F (Four-Wire, Full-Duplex) Mode

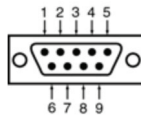


Figure C-2. DB9 male connector.

Table C-2. DB9 pinout in RS-485F mode.

RS-232 Signal Name	Direction	RS-422	DB9 M Pin
Receive Data A (-)	In	RXDA (-)	1
Receive Data B (+)	In	RXDB (+)	2
Transmit Data B (+)	Out	TXDB (+)	3
Transmit Data A (-)	Out	TXDA (-)	4
Signal Ground	—	GND	5
Clear To Send A (-)	In	CTSA (-)	6
Clear To Send B (+)	In	CTSB (+)	7
Request To Send B (+)	Out	RTSB (+)	8
Request To Send A (-)	Out	RTSA (-)	9

NOTE: Some RS-485 devices are marked opposite the RS-485 standard, which defines the Data B line as positive relative to Data A during a Mark state before enabling the transmitter, and after transmitting before tri-stating. If an RS-485 device does not respond, try swapping the Data B and Data A lines.

C.3 1-Port Serial Server Terminal Block Pin-out in RS-485F (Four-Wire, Full-Duplex) Mode

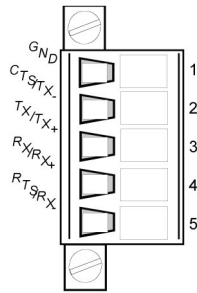


Figure C-3. Terminal block connector.

Table C-3. Terminal block connector pinning in RS-485F mode.

Signal Name	RS-422	Direction	Terminal
Signal Ground	GND	—	1
Transmit Data (-)	TXD(-)	Out	2
Transmit Data (+)	TXD(+)	Out	3
Receive Data (+)	RXD(+)	In	4
Receive Data (-)	RXD(-)	In	5

Appendix D: Network Connections

Appendix D. Network Connections

D.1 Standard Ethernet Cable RJ-45 Pinout

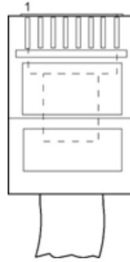


Figure D-1. RJ-45 connector.

Table D-1. T-568A straight-through Ethernet cable connector pinout.

RJ-45 Pin	Signal	Wire Color	RJ-45 Pin
1	TX+	White-Green	1
2	TX-	Green	2
3	RX+	White-Orange	3
4	Not used	Blue	4
5	Not used	White-Blue	5
6	RX-	Orange	6
7	Not used	White-Brown	7
8	Not used	Brown	8

Table D-2. T-568B straight-through Ethernet cable connector pinout.

RJ-45 Pin	Signal	Wire Color	RJ-45 Pin
1	TX+	White-Orange	1
2	TX-	Orange	2
3	RX+	White-Green	3
4	Not used	Blue	4
5	Not used	White-Blue	5
6	RX-	Green	6
7	Not used	White-Brown	7
8	Not used	Brown	8

D.2 Crossover Ethernet Cable RJ-45 Pinout

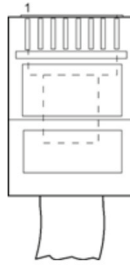


Figure D-2. RJ-45 connector.

Table D-3. RJ-45 Ethernet crossover cable connector pinout.

RJ-45 Pin	Signal	Wire Color	RJ-45 Pin
1	TX+	White-Green	3
2	TX-	Green	6
3	RX+	White-Orange	1
4	Not used	Blue	4
5	Not used	White-Blue	5
6	RX-	Orange	2
7	Not used	White-Brown	7
8	Not used	Brown	8

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